

# APPENDIX A

**STATEMENT OF WORK  
FOR THE CONSENT DECREE  
REMEDIAL DESIGN, REMEDIAL ACTION & LONG-TERM MONITORING**

**MOUTH OF HYLEBOS WATERWAY PROBLEM AREA:  
SEGMENTS 3, 4 AND 5  
AND PORTIONS OF SEGMENT 1**

**COMMENCEMENT BAY NEARSHORE/TIDEFLATS SUPERFUND SITE  
TACOMA, WASHINGTON**

**APPENDIX A**

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## **I. PURPOSE**

The purpose of this Statement of Work (SOW) is to set forth requirements for implementation of the remedial design and remedial action activities that the Settling Defendants are required to perform under the Consent Decree (CD) for Remedial Design and Remedial Action (RD/RA), addressing Segments 3, 4, and 5 and portions of Segment 1 of the Hylebos Waterway (herein collectively referred to as the “Mouth of Hylebos Waterway Problem Area,” further described below). This SOW also addresses all activities associated with the construction, filling, completion, operation, and maintenance of the Nearshore Confined Disposal (NCD) Facility located at the Port of Tacoma’s “Slip 1,” as well as the related habitat mitigation activities at the “Slip 5” and “Clear Creek” sites. This SOW does not address activities in and/or adjacent to Segment 5 of the Hylebos Waterway that are being performed under the Occidental Site Administrative Order on Consent (AOC) as amended January 2005. However, this SOW does address the placement and confinement of treated Area 5106 Sediment and other Occidental Site sediments in the NCD Facility.

This SOW is consistent with the Record of Decision (ROD), signed by the Regional Administrator of the United States Environmental Protection Agency (EPA), Region 10 on September 30, 1989, for the Commencement Bay Nearshore/Tideflats (CB/NT) Superfund Site (the CB/NT Site), and the Explanation of Significant Difference (ESD) dated July 28, 1997 (1997 ESD) and a separate ESD dated August 3, 2000 (2000 ESD). The 2000 ESD specifies the cleanup plan, various performance criteria and the disposal sites for the Hylebos Waterway Problem Areas, among other CB/NT problem areas. The 1997 ESD modified the sediment cleanup standard for polychlorinated biphenyls (PCBs). This SOW is Appendix A to the above-referenced CD.

In addition to outlining the requirements for implementation of the remedial design and remedial action, this SOW provides a summary of all of the work previously completed under EPA oversight pursuant to the Unilateral Administrative Order for Remedial Design and Remedial Action issued to the Settling Defendants Port of Tacoma and Occidental Chemical Corporation (EPA Docket No. CERCLA 10-2002-0064), including references to documentation submitted by the Settling Defendants and approvals by EPA. All work completed by the Settling Defendants to date, is summarized in Section V of this SOW. All such work approved by EPA is incorporated into this SOW by this reference.

Appendix A  
Mouth of Hylebos Waterway SOW

The Mouth of Hylebos Waterway Problem Area, located within the Commencement Bay Nearshore/Tideflats (CB/NT) Superfund site in Pierce County, Washington is shown on Figure 1. Using the delineation of the Hylebos Waterway segments developed during the Hylebos Cleanup Committee's pre-remedial design activities, Segment 5 includes the area within the Hylebos Waterway north of East Eleventh Street Bridge. Segments 3 and 4 are located south of East Eleventh Street Bridge and north of or adjacent to the former Murray Pacific facility, including SMA 302, as depicted in the 2000 ESD. Segment 1 of the Hylebos Waterway is depicted on Figure 1 and includes the Upper Turning Basin at the southernmost end of the waterway and portions of the neck of the waterway. This SOW includes only those portions of Segment 1 designated as Sediment Management Areas (SMA) 103 and 123.

In conducting the work specified in this SOW, the Settling Defendants shall follow:

- The 1989 ROD as modified by the 1997 and 2000 ESDs;
- Approved pre-remedial design deliverables;
- This SOW;
- Approved Remedial Design (RD) and Remedial Action (RA) Work Plans; and
- EPA Superfund Remedial Design and Remedial Action Guidance applicable to submitting deliverables for designing and implementing the remedial action at the Mouth of the Hylebos Waterway Problem Area of the CB/NT Site.

Disposal sites for contaminated sediments were identified in the 2000 ESD which provided the Settling Defendants with suitable locations for sediment waste disposal. The Settling Defendants have selected the Blair Waterway Slip 1 as the disposal site for Mouth of the Hylebos Waterway Problem Area, treated Area 5106 sediments, and other Occidental Site sediments requiring confined disposal, subject to meeting technical criteria for disposal at the Slip 1 NCD. The Settling Defendants will utilize the Puget Sound Dredge Disposal Analysis (PSDDA) open-water disposal site for dredged sediment that does not require confined disposal and meets the appropriate requirements of the PSDDA site, including acquisition of all necessary permits.

One objective of the Mouth of Hylebos Waterway Problem Area project was to maximize remedial action that could reasonably occur in the 2002-2003 in-water construction season. Therefore, the Settling Defendants initiated pier demolition in Slip 1 and Stage I construction of the NCD Facility containment berm in 2002-2003 (See Sections V and VI). Additionally, the

Settling Defendants prepared an RD Work Plan which proposed an implementation strategy that identified additional remedial action elements to be accomplished in 2002. The RD Work Plan also presented a generalized construction schedule for the remainder of the project. All such activities that have been approved by EPA are incorporated into this SOW by this reference.

The purpose of this SOW is to describe work known to be necessary to achieve the CB/NT Site cleanup objectives, including the Sediment Quality Objectives (SQOs). If EPA determines at some future date that additional work is needed to achieve cleanup EPA shall amend this SOW consistent with the CD.

## **II. DESCRIPTION OF REMEDIAL ACTION**

### **A. Key Elements of CB/NT ROD**

The CB/NT ROD selected a remedy comprised of the following five (5) key elements to address contaminated sediments in the waterways of the CB/NT site:

1. Site use restrictions (now commonly referred to as institutional controls);
2. Source control;
3. Natural recovery;
4. Sediment remedial action (i.e., confinement); and
5. Monitoring.

Four (4) of the five (5) primary elements of the CB/NT ROD will be implemented under this SOW including site use restrictions, natural recovery (including the potential for active sediment remediation if natural recovery does not occur as required), sediment remedial action (including habitat mitigation), and monitoring. Source control of ongoing sources of hazardous substances to the Hylebos Waterway problem areas is not an anticipated element of this SOW. The Washington State Department of Ecology (Ecology) has been designated as the lead agency for upland source control at the CB/NT Site. Ecology issued its Milestone 5 report, the final administrative milestone for source control, documenting completion of activities for Hylebos Waterway on June 14, 2000 (Ecology 2000). Since then, EPA and Ecology have determined that the Milestone 5 report mistakenly assumed that all sources of contamination at the Occidental Site were adequately characterized and contained. Additional Occidental Site characterization, remedial alternatives analyses, and integrated (upland/sediment) remedial design are covered

under a separate AOC amendment of January 2005. The defendants accept Ecology's (2000) determination that source control is substantively complete and effective in preventing future sediment contamination. This SOW anticipates that remedial design and remedial action will not need to be accompanied by further upland source control actions. If additional source control actions are needed to conduct or protect RD/RA, EPA may amend this SOW accordingly. Monitoring will be implemented under this SOW (Task VI) to assist EPA and Ecology in verifying source control effectiveness. As necessary, monitoring may include ground water and subsurface sediments that have a significant potential to contaminate the biologically active zone. Specific monitoring requirements will be set forth in the Operations, Maintenance, and Monitoring Plan (OMMP) described in Task 6 of Section V of this SOW.

## **B. Cleanup Objectives**

The cleanup objectives for the remedial action, as described in Section 10 of the 1989 ROD, state, "the selected remedy is to achieve acceptable sediment quality in a reasonable time frame" (CB/NT ROD, p. 97). Habitat function and enhancement of fisheries resources are also project cleanup objectives.

### **1. Acceptable Sediment Quality in a Reasonable Time Frame**

"Acceptable sediment quality" is defined as "the absence of acute or chronic adverse effects on biological resources or significant human health risk" (CB/NT ROD, p.62). The ROD designated biological test requirements and associated sediment chemical concentrations referred to as sediment quality objectives (SQOs) to attain cleanup objectives for the CB/NT Site. The SQO for polychlorinated biphenyls (PCBs) was subsequently updated in a 1997 ESD.

SQOs and satisfactory biological toxicity test results are performance standards for the CB/NT site. SQOs for individual chemicals specified in the ROD, as amended in the 1997 ESD, are provided in Table 1 of this SOW. In addition to comparing sediment concentrations with SQOs, the Settling Defendants may elect, with EPA approval, to perform appropriate biological toxicity tests for all chemicals except PCBs to demonstrate the absence of biological effects predicted by the SQOs. Toxicity testing may also be used to assess the suitability of sediments for open-water disposal when chemical data predict that biological effects might be present. Typical biological test criteria are provided in Table 1 to this SOW.

A “reasonable time frame” incorporates the ROD’s selection of natural recovery for sediments in the CB/NT site that are minimally contaminated and are predicted to naturally recover within 10 years from implementation of the remedial action in any given SMA. The Pre-Remedial Design Evaluation (PRDE) Report identified a number of different potential natural recovery areas, including areas within the Mouth of Hylebos Waterway Problem Area. However, since these identified natural recovery areas overlap with subsurface chemistry, the Settling Defendants may address some or all of these areas through active remediation rather than rely on natural recovery and long-term monitoring. Performance monitoring of natural recovery areas is a requirement of this SOW and is discussed in more detail in Section III below.

Except for natural recovery areas, the time frame for achieving SQOs or satisfactory biological toxicity test results shall be the end of construction of individual elements of the remedial action, as detailed in the Construction Quality Assurance Plan(s) (CQAP) and OMMP(s), as appropriate, to be approved by EPA under this SOW. Determining whether the sediment quality cleanup objectives have been achieved will be verified through a comparison of post-remedial sediment chemistry with SQOs at discrete locations and/or through the results of biological testing. In addition, cleanup objectives will be verified with a statistical comparison of performance monitoring data with SQOs, surrounding surface chemistry, and Sediment Remedial Action Levels (SRALs). The sediment quality monitoring and decision framework will be detailed in the OMMP(s).

## **2. Habitat Function and Enhancement of Fisheries Resources**

Habitat function and enhancement of fisheries resources have also been incorporated as part of the overall project cleanup objectives. For example, the physical characteristics and placement of material used for capping contaminated sediments in the marine environment will be required to provide a suitable substrate and habitat for aquatic organisms that may utilize that environment.

Consideration of habitat function and enhancement of fisheries resources is required under this SOW to meet cleanup objectives and comply with ARARs, including the Clean Water Act, Endangered Species Act, and the Puyallup Tribe of Indians Settlement Act of 1989. Remedial designs and actions will be performed consistent with biological assessments and biological opinions.



### **C. Mouth of Hylebos Waterway Problem Area**

The 1989 ROD and 2000 ESD specified confinement as a primary component of the sediment cleanup remedy, and identified in-place capping and nearshore disposal as practicable options for portions of the Hylebos Waterway cleanup, including the Mouth of Hylebos Waterway Problem Area. In-place capping, which involves physical containment and chemical isolation of contaminated sediment by placing clean material on top of existing substrate, will be used to remediate nearshore embankment areas in the areas where removal is not practicable. Nearshore disposal involves removal (i.e., dredging) of sediment followed by confined disposal in the nearshore environment. Dredging will occur largely within open access areas of the waterway. Dredged sediment not suitable for open-water disposal or beneficial reuse will be confined in the Blair Waterway Slip 1 nearshore confined disposal facility (the “NCD Facility”). Approximately 36,000 cubic yards of sediment within Area 5106 depicted on Figure 3, has been dredged and treated pursuant to a separate consent decree prior to placement and confinement in the NCD Facility. However, this SOW requires coordination with the Area 5106 Project and other aspects of the remaining Occidental Site remediation as it relates to placement and confinement of treated and untreated Occidental Site sediments in the Slip 1 NCD Facility, subject to meeting technical criteria for disposal at the Slip 1 NCD. The SMAs shown in Figures 2 and 3, and described in more detail in subsequent sections of this SOW, represent the cleanup plan of the 2000 ESD, which is subject to remedial design as approved by EPA and remedial action under EPA oversight under this SOW.

#### **1. PSDDA Testing and Disposal**

EPA’s 2000 ESD encouraged open-water disposal at the PSDDA site or beneficial reuse of qualifying sediment. Sediments determined to be suitable for PSDDA disposal or beneficial reuse will be managed under existing authorities of the Puget Sound Dredge Material Management Program (DMMP).

In 2000, the Settling Defendants performed PSDDA testing of dredged material management units (DMMUs) in various areas of the Mouth of Hylebos Waterway Problem Area, under the supervision of the DMMP. Results of the PSSDA sampling and analysis, including confirmatory biological testing, are provided in the Hylebos Waterway Phase I PSDDA Suitability Report (Anchor 2000), approved by the DMMP in 2001. Suitability determinations

are summarized on Figure 3. Those DMMUs that comply with PSDDA open-water disposal or beneficial reuse criteria have been or will be managed through the DMMP and disposed of at an open-water disposal site permitted by the DMMP agencies. However, all design and dredging of material suitable for open-water disposal will be reviewed and approved by EPA as part of this SOW. This is being done to accomplish a complete cleanup of the Mouth of Hylebos Waterway Problem Area, and to ensure that only those sediments requiring confined disposal are contained in the NCD Facility. Activities that have been approved by EPA are incorporated into this SOW by this reference.

## **2. Blair Slip 1 Nearshore Confined Disposal Facility (“NCD Facility”)**

The Blair Slip 1 NCD Facility will be used as the disposal site for dredged material removed from the Mouth of Hylebos Waterway Problem Area, including the Occidental Site, that requires confinement, as well as for material to be addressed by Settling Defendants and/or other parties from other locations, subject to meeting technical criteria for disposal at the Slip 1 NCD. Consistent with the 2000 ESD, the design of the NCD Facility includes the following elements:

- a) Demolition of structures adjacent to and within Slip 1.
- b) Construction of a berm across the face of Slip 1.
- c) Placement and confinement in the NCD Facility of dredged material removed from the Hylebos Waterway Problem Area requiring confined disposal, as well as placement and confinement of material to be addressed by Settling Defendants and/or other parties from other locations, as designated by the Settling Defendants and as approved by EPA. Such material will include approximately 36,000 cubic yards (cy) of treated sediment from Area 5106 placed by Occidental Chemical Corporation, approximately 100,000 cy of dredged material from the Middle Waterway placed by the Middle Waterway Action Committee (MWAC), approximately 10,000 cy placed by Manke Lumber from the Head of the Hylebos Waterway, and may include other material. Additional material from areas outside of the CB/NT Site may be placed and confined in the NCD Facility subject to receipt by the Settling Defendants of all necessary government approvals. However, placement of non-CB/NT material must be compatible with timely completion of the Hylebos Waterway cleanup. Material requiring confined disposal shall be placed at or below elevation +9 feet mean lower low water (MLLW) where it will remain in a saturated state.

- d) Placement of a cap from the top of the confined material to the ground surface, which will include an impervious cover (asphalt concrete pavement) to provide water quality protection.
- d) The NCD Facility will be designed, at a minimum, to accommodate all material dredged under this SOW from the Mouth of Hylebos Waterway Problem Area (other than dredged material approved for PSDDA disposal). The NCD Facility will also be designed to include the material from other sources including treated and untreated sediment from Area 5106, other Occidental Site sediments, Middle Waterway sediment, and Manke Lumber sediment, as agreed to between Occidental Chemical Corporation, the Port of Tacoma, and the other pertinent parties.

At the time of this writing, structures adjacent to and within Slip 1 have been demolished and the Slip 1 NCD Facility containment berm has been constructed to elevation 14 feet (MLLW) in two separate stages of construction, timed to allow strength gain of the underlying soft foundation soils. In accordance with the requirements outlined in Task 3 of Section IV of this SOW, the Settling Defendants submitted an RA Work Plan for the structure demolition in Slip 1 on July 1, 2002, which received EPA approval on July 23, 2002. The Settling Defendants also submitted an RA Work Plan for the Stage I Berm construction on August 30, 2002, which was approved by EPA on September 20, 2002. In addition, the Settling Defendants submitted an RA Work Plan for Stage II berm construction as part of the Segment 5 cleanup on June 20, 2003, which was conditionally approved by EPA on August 8, 2003. Activities that were approved by EPA are incorporated into this SOW by this reference.

Following placement of dredged material from Segments 3 and 4 of the Mouth of Hylebos Waterway Problem Area and placement of any other material approved for placement and confinement, the containment berm will be completed to its final elevation of 18 feet (MLLW) and the entire Slip 1 NCD Facility will be capped.

### **3. Mouth of Hylebos Waterway Problem Area Open Access Dredge Areas**

Previous investigations and preliminary engineering evaluations of the Mouth of Hylebos Waterway Problem Area are documented in the Hylebos Waterway Pre-Remedial Design Evaluation Report (PRDE Report), approved by EPA in November 1999. Consistent with the PRDE Report and the 2000 ESD, sediment requiring confined disposal shall be dredged and

disposed of in the Slip 1 NCD Facility. Areas to be dredged are shown on Figures 2 and 3. Wherever practicable, sediment will be dredged to below the native sediment interface. Performance monitoring will be undertaken, and additional dredging completed as necessary, to ensure removal of sediment exceeding applicable SQOs. Dredging and performance monitoring requirements are described in Section III.B below, and shall be detailed in the CQAP(s) and OMMP(s), as appropriate.

#### **4. Embankment Cleanups**

The embankment areas to be addressed in the Mouth of Hylebos Waterway Problem Area under this SOW include:

- a) The Port Industrial Yard (SMA 531)
- b) Parcel 4 (SMA 541)
- c) City of Tacoma (SMA 402)
- d) Taylor Way Properties (SMA 431)
- e) Buffelen (SMA 341)
- f) Murray Pacific (SMA 342)
- g) Sound Refining (SMA 432)
- h) Port of Tacoma (formerly Wasser Winters) Embankment (SMA 103)
- i) Puyallup Tribe (SMA 123)

The Settling Defendants shall perform the embankment cleanup actions required under this SOW to ensure that performance standards are achieved for these areas of the Hylebos Waterway. To the extent that individual property owners request design elements not covered by this SOW, the time lines and coordination for the embankment cleanup with respect to items outside the scope of this SOW shall be identified in the RA Work Plans (see Section IV, Task 3). These coordination activities will also be addressed in separate deliverables to EPA as necessary to ensure the sediment remedial action is conducted in compliance with this SOW and the remedial action schedule. The SMAs subject to the terms of the consent decree entered in U.S. v. Mary Jane Anderson, et al, Civil Action Number C03-5107 (W.D. WA 2003) will be addressed consistent with those terms.

The appropriate remedial action (capping or dredging or natural recovery) for the embankment

actions described above will be evaluated in the remedial design deliverables submitted under this SOW.

## **5. Natural Recovery Areas**

Natural recovery has been selected for specific portions of the Hylebos Waterway as an acceptable remediation approach at locations where sediments are marginally contaminated, are likely to recover to SQOs within the ten (10) year time frame specified in the ROD, and are located in areas with a low potential for future exposure of subsurface contamination. At the CB/NT Site, EPA considers marginally contaminated sediments as those with chemical concentrations less than the second lowest Apparent Effects Threshold (AET) value (the SQO is set at the lowest AET) or biological test results that do not exceed the minimum cleanup level (MCUL) values under Washington State Sediment Management Standards (SMS). Numeric AET chemical concentration values are those specified in the 1989 ROD, while biological MCUL criteria are those specified in SMS regulations. Where PCBs are present, marginally contaminated sediments are those with PCB concentrations below 450 parts per billion (ppb) as identified in the 2000 ESD.

The PRDE Report predicted that the Chinook Marina in Segment 5 would naturally recover within the 10 years following active remediation of the adjacent waterway. The Settling Defendants will monitor this area to verify compliance with performance monitoring criteria summarized in Table 1 (including optional biological monitoring; see Table 1). If future monitoring data indicate that natural recovery will not or does not occur within the next 10 years, the need for enhanced natural recovery and/or active sediment remediation will be reassessed with EPA, consistent with the 2000 ESD. The scope of long-term monitoring and appropriate response actions will be established in the overall Mouth of Hylebos OMMP.

The PRDE Report also predicted that several areas within Segment 3 and 4 would naturally recover within the 10 years following active remediation of the adjacent waterway. Performance monitoring will be performed to verify compliance with criteria summarized in Table 1 (including optional biological monitoring; see Table 1). If future monitoring data indicate that natural recovery will not or does not occur within 10 years, the need for enhanced natural recovery and/or active sediment remediation will be reassessed by the Settling Defendants and EPA, consistent with the 2000 ESD. The scope of long-term monitoring and appropriate response

actions will be established in the overall Mouth of Hylebos OMMP

As part of the remedial design, the Settling Defendants may choose to address natural recovery areas through active remediation rather than rely on natural recovery and the long-term monitoring performance monitoring required with natural recovery.

#### **D. Coordination with the Occidental Site AOC**

EPA and Occidental previously identified two non-time critical removal actions related to the former Occidental facility located at the Mouth of Hylebos Waterway Problem Area—Area 5106 and the Embankment Area. Engineering Evaluation/Cost Analysis (EE/CA) documents were prepared under a separate Administrative Order on Consent (AOC) No. 10-97-0011-CERCLA, and most of the Area 5106 Removal Action was completed. Information obtained since 2003 led Occidental, EPA and Ecology to determine that remaining sediment, ground water, and soil contamination at the Occidental Site should be characterized and remediated in an integrated manner which meets the requirements of both agencies. These actions are now the subject of the Occidental Site AOC as amended January 2005. Under this SOW, coordination with the Occidental Site amended AOC is required.

### **III. PERFORMANCE STANDARDS**

Settling Defendants shall adhere to the following performance standards for the design and implementation of the Mouth of Hylebos Waterway Problem Area Remedial Design/Remedial Action (RD/RA). These performance standards, as stated in the 2000 ESD or elsewhere, are consistent with the cleanup objectives and are necessary to ensure that the remedy is protective of human health and the environment, and complies with Applicable or Relevant and Appropriate Requirements (ARARs). Performance standards shall include cleanup standards, standards of control, quality criteria, and other substantive requirements, criteria, or limitations including all ARARs set forth in the 1989 ROD, 1997 and 2000 ESDs, this SOW, and/or CD, and approved deliverables under this SOW. The Settling Defendants shall address these performance standards in remedial design and shall identify additional performance standards and methods necessary to successfully implement the remedial action, including performance standards to monitor the long-term effectiveness of the remedial action and mitigation areas.

## A. Cap Requirements

One of the remedial actions selected in the 1989 ROD and included in the preliminary cleanup plans for the Hylebos Waterway is capping. The Settling Defendants shall follow EPA guidance, “Guidance for *In-situ* Subaqueous Capping of Contaminated Sediments” (September 1998, Reference EPA 905-B6-004) for the design and construction of capped areas.

In the remedial design, the Settling Defendants shall evaluate each embankment SMA on a property-by-property basis to identify a final design for capping or dredging or natural recovery. For each property, the Settling Defendants’ basis for design shall address the following factors:

- protectiveness of the proposed cap,
- compatibility with current and anticipated future land use,
- property owner’s willingness to implement use restrictions on the capped area and/or ensure such restrictions will run with the land,
- engineering constraints, and
- avoidance and/or minimization of habitat impacts and identification of appropriate mitigation under CWA Section 404, and compliance with Endangered Species Act measures that may be identified.

The SMAs subject to the terms of the consent decree entered in U.S. v. Mary Jane Anderson, et al., Civil Action Number C03-5107 (W.D. WA 2003) will be addressed consistent with those terms.

EPA intends to maintain the integrity and effectiveness of any capped area over contaminated sediments through requirements for construction, long-term monitoring, and maintenance, including the following:

1. Caps will have a minimum thickness of three (3) feet unless an alternative thickness is demonstrated to be consistent with “Guidance for *In-situ* Subaqueous Capping of Contaminated Sediments,” and/or otherwise approved by EPA. Caps will be constructed to address adverse impacts through four primary functions:
  - a. Physical isolation of the contaminated sediment from the ecological receptors;

- b. Complete confinement and stabilization of contaminated sediments, preventing resuspension and transport to other locations within the waterway;
  - c. Reduction of chemicals transported through the groundwater pathway to levels that will not impact surface sediments (defined as the “biologically active zone” where most sediment-dwelling organisms live) above the SQOs, and will not impact surface water at levels exceeding background concentrations or marine chronic water quality criteria identified in Table 2;
  - d. Provide a cap surface that promotes colonization by aquatic organisms, unless it is demonstrated not to be practicable.
2. Long-term monitoring of the cap may include visual inspection, bathymetric survey, sediment deposition monitoring, chemical monitoring, and biological monitoring. The monitoring requirements will be specified in the OMMP(s).

The Settling Defendants shall demonstrate that all capped areas are completed in accordance with these performance standards. The methods for achieving the objectives for the capped areas shall be set forth in the Design Report(s). Verification of performance standards shall be documented in the CQAP(s) and the OMMP(s), as appropriate. As-builts shall be provided for each capped SMA in the Remedial Action Construction Report (see Section IV, Task 4).

## **B. Dredging and Confined Disposal**

Performance standards for dredging and placement in the NCD Facility shall be consistent with the CB/NT ROD and ARARs including the Clean Water Act, Rivers and Harbors Act, and Endangered Species Act requirements. Under this SOW, the Mouth of Hylebos Waterway Problem Area, including the NCD Facility will be subject to construction quality assurance and long-term monitoring to ensure that the selected remedy remains protective, and that applicable water quality standards are not exceeded beyond the surface water mixing zone identified for in-water activities (e.g., capping, dredging, and placement in the NCD Facility) and outside of the NCD Facility during and after construction. Ground water discharging from Slip 1 shall not exceed concentrations which can be expected to contaminate sediment above an SQO. Section 401 of the Clean Water Act requires that both dredging and dredged material placement (including dewatering) operations shall not violate applicable effluent or water quality standards. EPA, working with Ecology, will be responsible for certifying during remedial design that such



operations will comply with this requirement. This determination allows for the designation of mixing zones within which standards may be exceeded, but beyond which applicable standards must be met. While dredging and placement operations conducted as part of a remedial action within a CB/NT problem area do not require a formal Section 401 water quality certification from Ecology, these operations must comply with the substantive requirements of such certification, including specified monitoring and reporting requirements identified by EPA.

The mixing zone utilized during other dredging actions and placement in the NCD Facility (including temporary discharge of dewatering fluids as appropriate), will require a water-quality certification from EPA. The Settling Defendants shall submit water quality monitoring plans as part of the CQAP(s) required under this SOW.

The Settling Defendants shall design and implement the dredging of designated SMAs necessary to achieve SQO cleanup levels in those areas EPA has determined will not naturally recover within 10 years. Wherever practicable, sediment will be dredged to below the native sediment interface. Performance monitoring will be undertaken, and additional dredging completed as necessary, as detailed in the OMMP(s) to be approved by EPA. The need for additional dredging will be determined based on a comparison of post-remedial action sediment chemistry with SQOs, and/or the results of biological testing. In addition, the need for additional dredging may be based on a statistical comparison of performance monitoring data with SQOs, surrounding surface chemistry, and SRALs. The sediment quality monitoring and decision framework for long-term effectiveness will be detailed in the OMMP(s).

Contaminated sediment shall be dredged and placed in the NCD Facility. As-built drawings of all dredged surfaces shall be provided to EPA in the Remedial Action Construction Report (see Section IV, Task 4). The Settling Defendants shall document to EPA quantities (in-place volumes), and placement location (the NCD Facility) for each SMA dredged from the Mouth of Hylebos Waterway Problem Area.

The methods for achieving the objectives for dredged areas and the Slip 1 NCD Facility addressed under this SOW shall be set forth in the Design Report(s), the CQAP(s) and the OMMP(s), as appropriate. Verification that performance standards, including SQOs and/or results of biological testing, have been achieved shall be documented in the Pre-Final Inspection Report, Final Inspection Report, and/or the Remedial Action Completion Report, as appropriate.

### **C. Natural Recovery**

For those areas selected for natural recovery, the Settling Defendants shall perform/prepare the following:

- Monitoring plans,
- Identify triggers for initiating additional response actions if the monitoring indicates natural recovery will not succeed in the ten (10) year time frame, and
- Specify additional response actions for active remediation if monitoring indicates natural recovery will not occur by year ten (10).

These elements shall be primarily addressed in the OMMP(s) for the Site and other deliverables, as appropriate. Natural recovery monitoring will be performed until cleanup objectives have been achieved.

### **D. Subsurface Contamination**

The plan for dredging SMAs in the Mouth of Hylebos Waterway Problem Area included in this SOW (Figures 2 and 3) includes all areas of subsurface contamination that EPA determined had a high to moderate potential for future exposure. Contaminated subsurface sediments that EPA determined had a low potential for exposure will require long-term monitoring under this SOW. Because exposure of contaminated subsurface sediments may occur during the cleanup by dredging adjacent areas, the Settling Defendants shall, under this SOW, prepare a final remedial design and implement the remedial action to ensure that contaminated subsurface sediment is not exposed and that SQOs are achieved at the face of every dredge cut (consistent with approved OMMPs). Where EPA determines it is not practicable to achieve SQOs at the face of a dredge cut, Enhanced Natural Recovery or alternatives other than dredging may be proposed by the Settling Defendants.

Because exposure of contaminated subsurface sediments may occur after construction of the remedial action through physical processes, such as storms or ship scour, or through future dredging or excavation, under this SOW, the Settling Defendants shall conduct long-term monitoring in these areas as set forth in an approved OMMP. This element of long-term monitoring shall be designed, in part, to detect recontamination from buried subsurface

contamination.

Ground water flowing through subsurface source material can potentially result in pore water or sediment contamination within the biologically active zone. If needed, monitoring may be conducted as set forth in the OMMP, to assess the degree of chemical isolation provided by overlying sediment

### **Conservation Measures and Mitigation**

The Settling Defendants shall take all appropriate measures during remedial design, construction, and site maintenance to avoid and minimize adverse impacts to the aquatic environment resulting from implementation of the remedial action. As set forth in the CB/NT Biological Assessment (BA) prepared by EPA, and in the 2000 ESD, a range of conservation measures are required by EPA to ensure that critical habitat for listed species is protected by the remedial action.

Conservation measures for work in the Mouth of Hylebos Waterway Problem Area include:

- Design of capping actions to avoid conversion of aquatic habitat to upland in the Mouth of Hylebos Waterway Problem Area, or inclusion of compensatory mitigation measures if conversion is unavoidable;
- Design of dredging and capping actions to avoid conversion of intertidal habitat to subtidal habitat in the Mouth of Hylebos Waterway Problem Area, or inclusion of compensatory mitigation measures if conversion is unavoidable;
- Timing restrictions for in-water work to avoid fish-critical activity periods, such that no in-water work will occur during designated fish windows.
- Substantive compliance with water quality standards as specified in a water quality certification to be issued by EPA;
- Addition of select substrates (fish mix) as part of capping to assist in providing suitable habitat for prey items of juvenile salmonids; and
- Incorporation of specific measures (e.g., Best Management Practices) into the design, to reduce the potential for construction-related impacts to listed species or their habitats. Specific design measures will be reviewed and approved by EPA.

Additional Conservation Measures and Project specific compensatory mitigation were later added during Endangered Species Act Consultation and were presented to EPA in the BA

Addendum Prepared by Grette Associates (February 2003). Conservation measures are described in the BA Addendum.

Section 404 of the Clean Water Act requires compensatory mitigation for unavoidable loss of wetlands and aquatic habitat. Consistent with EPA's August 2000 ESD, habitat mitigation for the Project is consistent with the criteria and findings of the Commencement Bay Aquatic Ecosystem Assessment (Simenstad 2000). The overall goal of the compensatory mitigation is to contribute toward the recovery of ESA-listed species, consistent with the conservation measures in the BA and the August 2000 ESD performance standards for mitigation.

Compensatory mitigation for the Project was negotiated with EPA and was primarily associated with the loss of aquatic habitat in Slip 1. Construction of the Slip 1 NCD Facility will convert 2.62 acres of littoral habitat to uplands. To compensate for this unavoidable loss of habitat, littoral habitat is being provided at the Slip 5 mitigation site. Slip 5 Mitigation Site construction includes placement of select material and clean sandy dredged material to create an embayment, which is protected by a rocky reef on the outer edge. Activities in Slip 5 also include the extension of the Pier 1D Beach and placement of select substrate and large woody debris. In total, the mitigation action in Slip 5 converts 6.12 acres of subtidal habitat to littoral habitat. An additional 0.97 acre of existing littoral habitat within Slip 5 will be improved through changes in Slope and substrate. In total, the mitigation will yield increases in acreage and quality of littoral habitat and provide habitats that partly offset past cumulative impacts in the bay.

As an additional mitigation action for the Project, the Settling Defendants will construct a habitat improvement project adjacent to the existing Clear Creek Habitat Improvement Project. The proposed Clear Creek Habitat Improvement Project – Phase II involves converting existing upland and reed canary grass wetland into mudflat and tidal channels with abundant edge habitat. The Clear Creek Habitat Improvement Project – Phase II will provide a minimum of 2 acres of new habitat that is affected by tidal fluctuation and consisting of tidal channels separated by mudflat and/or emergent wetlands. As with the Slip 5 Mitigation Site, the Clear Creek Habitat Improvement Project Phase II is designed to be consistent with the criteria and findings of the ESD (EPA 2000) and the Commencement Bay Aquatic Ecosystem Assessment (Simenstad 2000).

#### **IV. WORK TO BE PERFORMED BY SETTLING DEFENDANTS**

To accomplish the work under the SOW, the remedial design/remedial action shall consist of the six (6) tasks summarized below. The Settling Defendants shall be responsible for implementing additional work elements necessary for successful implementation of the Mouth of Hylebos Waterway Problem Area remedial action. All plans are subject to EPA approval. To date, several of these tasks have been completed by the Settling Defendants, as described in Section V and summarized in tabular format in Section VI, RD/RA Schedule of Deliverables and Milestones.

Task 1: Remedial Design Work Plan

Task 2: Remedial Design

- A. Preliminary (30%) Design Deliverable (Segments 3 and 4 only)
- B. Draft (90%) Design
- C. Final (100%) Design

Task 3: Remedial Action Work Plan

Task 4: Remedial Action Construction and Documentation

- A. Award Construction
- B. Notification of RA Start
- C. Preconstruction Inspection/Meeting
- D. Initiate Construction
- E. RA Progress Meetings
- F. Pre-final Construction Inspection
- G. Final Construction Inspection
- H. Reports
  - Remedial Action Construction Report
  - Final Remedial Action Report

Task 5: Performance Monitoring and Construction Quality Assurance

Task 6: Long-term Operation, Maintenance & Monitoring

In an effort to initiate remedial action as quickly as possible, the Settling Defendants have submitted separate design deliverables for discrete elements of the remedial action as indicated in Task 2 below. Section V of this SOW discusses the status of the various deliverables and Section VI discusses the schedule for submission of the deliverables.

Additional details on each task are provided below. Documentation for each of the six tasks listed above has been/will be submitted to EPA for review and approval. As has been done for all deliverables to date, a draft version of each future document shall be submitted to EPA for review and comment unless otherwise agreed by EPA and the Settling Defendants. Subject to and in accordance with Section XI of the CD, upon receipt of EPA's comments on a draft document, the Settling Defendants shall submit to EPA a revised final document that incorporates EPA's modifications or summarizes and addresses EPA's concerns. All deliverables submitted in response to EPA's comments shall include a transmittal that responds directly to each comment, and identifies how the comment was addressed in the deliverable. This SOW also specifies submittal of certain documentation (e.g., construction progress reports, monthly progress reports) that will be used by EPA for informational purposes only but will not be formally approved by EPA.

### **Task 1: Remedial Design Work Plan**

The Settling Defendants shall submit a Remedial Design Work Plan to EPA for review and approval in accordance with Section IX.A. of the UAO and Section VI (Schedule of Milestones and Deliverables) of this SOW. The RD Work Plan shall summarize the overall management strategy for performing the design (including additional data needs), construction, operation, maintenance, and monitoring of remedial actions. The plan shall document the responsibility and authority of all organizations and key personnel involved with the implementation and shall include a description of qualifications of key personnel directing the remedial design, including contracting personnel. Contact information (address, phone number, and e-mail addresses) and general responsibilities for key personnel shall be provided. The RD Work Plan shall also contain a schedule of remedial design activities.

In addition to describing the overall management strategy and identifying additional data needs as described above, the Settling Defendants shall make all reasonable efforts to communicate to the public and business community and coordinate work under this SOW to minimize disruption of

normal use of the Hylebos Waterway and adjacent project areas. In the RD Work Plan, Settling Defendants shall address scheduling and coordination of work under this SOW with other in-water work or navigation near the project area that may occur. The Settling Defendants shall also initiate early discussions and coordination with property owners within the project area to determine if cleanup actions could potentially be efficiently integrated into a single combined action.

## **Task 2: Remedial Design**

The remedial design is generally defined as those activities to be undertaken to develop the final plans and specifications, general provisions, special requirements, and all other technical and procurement documentation necessary to fully implement the remedial action as described in the CB/NT ROD and this SOW. The Settling Defendants shall prepare construction plans and specifications to implement the remedial actions within the Mouth of Hylebos Waterway Problem Area as described in the ROD and in accordance with the schedule set forth in Section VI of this SOW. As approved by EPA, the Settling Defendants have divided the remedial design into five separate major design elements including the Slip 5 Habitat Construction, Clear Creek Habitat Improvement, Hylebos Waterway Segment 5, Hylebos Waterway Segments 3 and 4, and Pier 25 Embankment. Therefore, five separate sets of design submittals reflecting the five design elements of remedial action have been or will be submitted to EPA for review and approval. All remedial design work, including plans and specifications, shall be developed in accordance with EPA's Superfund Remedial Design and Remedial Action Guidance (OSWER Directive No. 9355.0-4A) and shall demonstrate that the remedial action shall meet all objectives of the ROD, CD, and this SOW, including all performance standards. The Settling Defendants shall meet regularly with EPA to discuss design issues. The following sections provide details on the required remedial design deliverables as well as a summary of the status of the various submittals at the time of this writing (See Sections V and VI).

### **A. Preliminary (30%) Design for Segments 3 and 4**

The Settling Defendants shall submit the Draft Segment 3 and 4 Preliminary (30%) Design Deliverable for discrete elements of Segments 3 and 4 described above, in accordance with the CD and Section VI (RD/RA Schedule of Deliverables & Milestones) of this SOW. The Draft Segments 3 and 4 Preliminary Design Deliverable will present, for EPA review and approval, the

results of remedial design sampling and analysis, and a preliminary dredge plan for identified SMAs within Segments 3 and 4, as set forth in the August 2000 ESD.

The Preliminary (30%) Design for Segments 3 and 4 was submitted to EPA in May 2003, as described in Section V of this SOW.

### **B. Draft Final (90%) Design**

Within sixty (60) days after receipt of EPA's comments on the Preliminary (30%) Design, the Settling Defendants shall submit the Draft Final Design Report that is approximately ninety (90) percent complete, unless otherwise approved by EPA.

The following design elements will be discrete Draft Final (90%) Design deliverables that are each subject to the schedule for submission requirements identified in Section VI of this SOW:

- Hylebos Segment 5 Cleanup/Slip 1 NCD Facility
- Hylebos Segments 3 and 4 Cleanup
- Pier 25 Embankment

The Draft Design submittals shall include or discuss, at a minimum, the following:

1. **Summary of pre-design field sampling and analysis results.** This shall include both previously approved EPA data/interpretations and new data presented for EPA approval;
2. **Basis for Design Report.** The Basis for Design Report (Design Analysis Report ["DAR"]) shall include a discussion of detailed design assumptions, parameters, design restrictions and objectives, for the following:
  - a. General Elements— description of analyses; technical parameters used; supporting calculations; required coordination and permits; and preliminary construction schedules.
  - b. Capping Elements – material types and testing procedures; compliance with



performance standards outlined in Section III of this SOW; habitat considerations; and construction techniques.

- c. Dredging Elements: – dredging, handling, transport, and disposal methods; dredge prism and overcut allowances; and performance standards outlined in Section III of this SOW.
  - d. Cost Estimate – refined Pre-Remedial Design estimate to reflect the detail presented in the Draft Design.
  - e. Project Schedule – schedule for design, construction, and implementation of the remedial action that identifies timing for initiation and completion of all critical path tasks. The schedule shall include construction sequencing between this SOW (Mouth of Hylebos Waterway Problem Area) and remedial action completed by others (e.g. Occidental Site amended AOC, MWAC placement of dredged material, Manke placement of dredged material).
3. **Plans and Specifications.** A complete set of plans and specifications defining the detailed design shall be included with the Draft (90%) Final Design submittal;;
4. **Draft CQAP.** The Draft Final (90 %) CQAP shall include a summary of roles and responsibilities, proposed inspection and verification activities, contractor qualification requirements, water quality monitoring requirements (described below), documentation, and reporting. In addition, the CQAP shall summarize the various construction elements, associated potential problems, and proposed quality control/quality assurance procedures to ensure the elements are constructed in accordance with the approved design. See Section IV, Task 5 of this SOW for additional details regarding the CQAP.
- a. Water Quality Monitoring Plan. The Water Quality Monitoring Plan shall be in accordance with the Water Quality Certification issued by EPA for the project. The plan will include the following minimum elements: monitoring

schedule, sampling locations, intervals, parameters, analytical methods, key contacts, reporting requirements (including daily reports), daily contacts for notifications of all exceedances, result summaries, and draft and final reports.

5. **Addendum to Biological Assessment.** The Settling Defendants shall submit an addendum to EPA's "Biological Assessment, Commencement Bay/Nearshore Tideflats Superfund Site," July 2000, addressing the performance standards in Section III.E. of this SOW, evaluating the following:
  - a. Impacts to filling Blair Slip 1. The Settling Defendants may submit to EPA the September 2001 BA that was submitted to the Corps to avoid redundant work effort. Appropriate modifications will be made to the document to reflect that contaminated sediment will be used for fill material consistent with this SOW. The compensatory mitigation plan for impacts associated with the filling of Blair Slip 1 shall also be submitted to EPA for approval
  - b. Net changes to intertidal and shallow subtidal habitat resulting from final dredging and capping designs in the Mouth of Hylebos Waterway Problem Area and identifying the need for mitigation of unavoidable impacts. If mitigation is necessary, a compensatory mitigation plan shall be submitted to EPA that also addresses the performance criteria in Section III.E. The Biological Assessment shall identify the proposed mitigation project for EPA approval;
6. **Draft OMMP.** The Draft Final (90 %) OMMP shall include a description of the post-remedial action environmental monitoring activities including data objectives, analyses to be performed, sampling equipment and methods to be used, and reporting. See Task 6 of this SOW for additional details regarding the OMMP

As discussed in Section V, the Draft Final (90%) Design for the Segment 5 Cleanup Project was submitted to EPA on June 29, 2001. The Settling Defendants submitted the Revised Draft Final (90%) Design for the Segments 3 and 4 Cleanup Project on January 30, 2004.

### **C. Final (100%) Design**

Within forty-five (45) days of receipt of EPA's comments on the Draft Final (90%) design, the Settling Defendants shall submit the Final Design that is one hundred (100) percent complete, unless otherwise approved by EPA. The Final (100%) Design shall fully address all comments made to the Draft (90%) Design and shall include reproducible plans and specifications suitable for bid advertisement. The final project schedule submitted as part of the Final (100%) Design shall include specific dates for major milestones and completion of the project. As described in Task 3 of this Section, certain elements of the design will be finalized as part of the subsequent RA Work Plan deliverable. This applies to the Clear Creek and Slip 5 Habitat Projects.

The following design elements will be discrete Final (90%) Design deliverables that are each subject to the schedule for submission requirements identified in Section VI of this SOW, unless otherwise approved by EPA:

- Hylebos Segment 5 Cleanup/Slip 1 NCD Facility
- Hylebos Segments 3 and 4 Cleanup
- Pier 25 Embankment

The project plans and specifications included with the Final (100%) Design shall include detailed descriptions of sampling activities, such as water quality performance sampling. The requirements for quality assurance sampling activities including the sampling protocols, sample size, locations, frequency of testing, acceptance and rejection data sheets, problem identification and corrective measures reports, evaluation reports, acceptance reports, and final documentation will be described. The CQAP(s) will address inspections, surveys, oversight, and reporting as described above in Task 2, B.4. Detailed procedures for sediment and water quality sampling and analysis (post-dredge confirmatory and long-term) shall be presented in the OMMP(s). The OMMP(s) shall include sediment sampling operations manual, quality assurance project plans, and health and safety plans for sediment sampling activities. Existing EPA-approved (HCC) Quality Assurance Project Plans (QAPPs) and other EPA-approved supporting documents may be referenced or included as appropriate.

As discussed in Section V, the Settling Defendants submitted the Final (100%) Design for the

Segment 5 Cleanup Project to EPA on June 20, 2003. Section VI summarizes the schedule for submittal of the Final (100%) Design for the Segments 3 and 4 Cleanup Project.

### **Task 3: Remedial Action Work Plan**

The Settling Defendants shall submit a Remedial Action (RA) Work Plan for each discrete group of remedial action construction activities. Discrete groups of construction activities, identified by the Settling Defendants and approved by EPA include the following:

- Clear Creek Habitat Improvement;
- Slip 5 Habitat Construction;
- Slip 1 Pier Demolition;
- Slip 1 NCD Facility Stage I Containment Berm Construction;
- Hylebos Waterway Segment 5 Cleanup / Slip 1 NCD Facility Project;
- Hylebos Waterway Segments 3 and 4 Cleanup Project; and
- Pier 25 Embankment Project.

Each RA Work Plan shall contain a detailed description of all remediation and construction activities, including how those construction activities are to be implemented by the Settling Defendants and coordinated with EPA (e.g., site-monitoring, material staging and handling). The following deliverables will be submitted with the RA Work Plan, and may serve as the Final (100%) Design, if approved by EPA (unless previously submitted and approved by EPA):

1. Final CQAP (See Task 5 for detail);
2. Final OMMP (See Task 6 for detail);
3. Final Contractor Pre-Construction Submittals describing remedial action construction activities (e.g., Water Quality Monitoring Plan, Health and Safety Plan, Environmental Protection Plan, Construction Quality Control (CQC) Plan, and Project Schedule).

The project schedule submitted as part of the RA Work Plans shall include each major activity and submission of deliverables generated during the remedial action. The project schedule shall

clearly describe the interrelationship between various discrete portions of the remedial and removal actions within this SOW. The Settling Defendants shall submit RA Work Plans in accordance with Section IX of the CD and Section VI of this SOW.

#### **Task 4: Remedial Action Construction and Documentation**

The Settling Defendants shall implement the remedial action as detailed in the approved Final (100%) Design(s) and Final RA Work Plan(s). The following activities shall be completed in constructing the remedial action.

##### **A. Award Construction Contract**

The Settling Defendants shall enter into a contract with a construction contractor following EPA approval of the Final (100%) Design and RA Work Plan for each discrete group of remedial action construction activities listed in Task 3. The Settling Defendants shall award the construction contract in accordance with Section VI of this SOW.

##### **B. Notification of RA Start**

The Settling Defendants shall notify EPA of the start date for RA construction in accordance with the schedule presented in Section VI of this SOW.

##### **C. Preconstruction Inspection and Meeting**

The Settling Defendants shall participate in a pre-construction inspection and meeting for each discrete group of remedial action construction activities (as listed in Task 3) with the selected contractor, EPA, and other agencies as appropriate. The following items will be discussed at the pre-construction meeting:

1. Review methods for documenting and reporting inspection data, and compliance with specifications and plans including methods for processing design changes and securing EPA review and approval of such changes as necessary;

2. Review methods for distributing and storing documents and reports;
3. Review work area security and safety protocol;
4. Demonstrate the construction management is in place, and discuss any appropriate modifications of the construction quality assurance plan to ensure that Site-specific considerations are addressed; and
5. Conduct a Site walk-about to verify that the design criteria, plans, and specifications are understood and to review material and equipment storage locations.

All inspections and meetings shall be documented by Settling Defendants' designated contact and minutes shall be transmitted to all parties within seven (7) working days of the inspection or meeting.

#### **D. Initiate Construction**

The Settling Defendants shall initiate RA construction of each discrete group of construction activities in accordance with the schedule presented in Section VI of this SOW.

#### **E. RA Briefings and Progress Meetings**

The Settling Defendants shall conduct RA briefings and progress meetings on a regular basis throughout the RA. Briefings shall be held on a weekly basis during construction to discuss issues such as the results of ongoing water quality monitoring and field changes unless EPA and the Settling Defendants agree to a less frequent schedule. Progress meetings shall be held at least monthly during construction, unless EPA and the Settling Defendants agree to a less frequent schedule. Progress meetings shall be scheduled on the same day that weekly briefings occur, thus eliminating the need for additional briefings during that week. At a minimum, the Settling Defendants shall address the following at progress meetings:

1. General progress of construction with respect to RA schedule;

2. Problems encountered and associated action items;
3. Pending design, personnel or schedule changes requiring EPA review and approval;
4. Results of any RA verification sampling and associated decisions and action items.

#### **F. Prefinal and Final Construction Inspections/Meetings**

The Settling Defendants shall conduct pre-final and final remedial action construction inspections in accordance with Paragraph 47.a of the CD.

#### **G. Pre-Final and Final Remedial Action Completion Inspections**

**The Settling Defendants shall conduct pre-final and final remedial action completion inspections in accordance with Paragraph 47.b of the CD.**

#### **H. Reports**

The Settling Defendants shall follow EPA guidance for preparing Remedial Action Reports described in “Close Out Procedures for National Priorities List Sites,” EPA 540-R-98-016, OSWER Directive 9320.2-09A-P, PB98-963223, January 2000 in submitting the following reports.

##### **1. Remedial Action Construction Report**

The Settling Defendants shall submit RA Construction Reports when the construction is complete for appropriate remedial action elements but, if applicable, before all performance standards have been attained (i.e., prior to achieving natural recovery and long-term performance standards for mitigation).

Within thirty (30) days of the last successful final construction inspection, the Settling Defendants shall submit a RA Construction Report. In the report, a registered professional engineer and the Settling Defendants' Project Coordinator shall state that the remedial action has been constructed in accordance with the design and specifications. The written report shall

include as-built drawings signed and stamped by a professional engineer, and other supporting documentation to demonstrate that the CQAP(s) and appropriate portions of the OMMP(s) were followed. The report shall contain the following statement, signed by a responsible corporate official of each Respondent or the Settling Defendants' Project Coordinator:

"To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

## **2. Remedial Action Completion Report**

The Settling Defendants shall submit RA Completion Reports after construction is complete for appropriate remedial action elements and all performance standards have been attained (including performance standards for natural recovery and mitigation areas, as applicable), but where OMMP requirements will continue to be performed.

Within thirty (30) days of a successful demonstration that all performance standards have been attained, the Settling Defendants shall submit a RA Completion Report. In the report, a registered professional engineer and a responsible corporate official or the Settling Defendants' Project Coordinator shall state the remedial action has been completed in full satisfaction of the requirements of the CD. The written report shall include a summary of all information (e.g., long-term monitoring data) demonstrating performance standards not met (e.g., natural recovery) in the RA Construction Report have been obtained. The report shall also include documentation not previously submitted with the RA Construction Report verifying that performance standards, including SQO cleanup objectives, have been attained. The report shall contain the following statement, signed by a responsible corporate official of each Respondent or the Settling Defendants' Project Coordinator:

"To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing



violations."

### **Task 5: Performance Monitoring and Construction Quality Assurance**

Performance monitoring shall be conducted to ensure that all performance standards are met, including cleanup verification methods and methods for determining compliance with performance standards and ARARs. The CQAP shall address performance standards related to the remedial action construction (e.g., inspections, surveys, oversight and reporting as described above in Task 1, B.4). Confirmatory sediment sampling to demonstrate completion of dredging, long-term achievement of SQOs throughout the Mouth of the Hylebos Waterway Problem Area and other long-term performance standards to be achieved after remedial action construction is completed (e.g., achievement of SQOs in natural recovery areas) shall be addressed in the OMMP(s), as described in Task 6. Existing EPA-approved (HCC) QAPPs and other supporting documents may be referenced as appropriate.

The documents listed in this section must be prepared and submitted consistent with Section III of this SOW. The required content of each of these documents is described below.

#### **A. Construction Quality Assurance Plan**

The Settling Defendants shall submit in accordance with the schedule in Section VI of this SOW, a Construction Quality Assurance Plan (CQAP) that describes the specific components of the performance methods and quality assurance program that shall ensure that the completed project meets or exceeds performance standards and design criteria, and the project plans and specifications, including achievement of SQOs as defined in this SOW. Consistent with preparation of discrete elements of the remedial design as described in Task 2, the Settling Defendants may submit more than one CQAP for discrete portions of the remedial action to facilitate contracting the remedial and removal actions under this SOW.

The draft CQAP(s) shall be submitted with the Draft Final (90%) Design Report and the final CQAP shall be submitted with the Final (100%) Design and also included with the RA Work Plan for each design. The CQAP(s) shall contain, at a minimum, the following elements:

1. Responsibilities and authorities of all organizations and key personnel involved

in the design and construction of the remedial action, including EPA and other agencies.

2. Qualifications of the Construction Quality Assurance (CQA) Official. Establish the minimum training and experience of the CQA Officer and supporting inspection personnel.
3. Performance Standards and Methods. Describe all performance standards and methods necessary to ensure implementation of the remedial action construction, including mitigation as appropriate, in compliance with ARARs and identified site-specific performance standards. Performance monitoring requirements shall be stated to demonstrate that best management practices have been implemented for dredging operations, transportation of dredged material, and proper cap placement techniques.
4. Inspection and Verification activities. Establish the observations and tests that will be required to monitor the construction and/or installation of the components of the remedial action. The plan shall include the general scope and frequency of each type of inspection to be conducted. Inspections shall be required to measure compliance with environmental requirements and ensure compliance with all health and safety procedures.
5. Documentation. Reporting requirements for CQA activities shall be described in detail in the CQAP. This shall include such items as daily summary reports, inspection data sheets, problem identification and corrective measures reports, design acceptance reports, and final documentation/storage. A description of the provisions for final storage of all records consistent with the requirements of the CD shall be included.
6. Field Changes. Describe procedures for processing design changes and securing EPA review and approval of such changes to ensure changes conform to performance standards, ARARs, requirements of this SOW, are consistent with Cleanup Objectives and are protective of human health and the environment.

7. Final Reporting. Identify all final CQAP documentation to be submitted to EPA in the in the RA Construction Report, or other deliverables and submissions.

Detailed procedures for water quality sampling and analysis described in the CQAP(s) shall be presented in the plans and specifications, as appropriate. Existing EPA-approved (HCC) QAPPs and other supporting documents may be referenced or included, as appropriate.

### **B. Quality Assurance Project Plans**

For a particular sampling event, the Settling Defendants may propose to use an existing EPA-approved QAPP. The Settling Defendants will identify whether any changes or additions are needed for each sampling effort. Regardless of whether the Settling Defendants utilize existing EPA-approved QAPPs or submit a new QAPP for a unique sampling event, the QAPP shall be consistent with the requirements of the EPA Contract Lab Program (CLP) for laboratories proposed outside the CLP. The QAPP shall at a minimum include the following:

1. Project Description
  - a. Facility Location History
  - b. Past Data Collection Activity
  - c. Project Scope
  - d. Sample Network Design
  - e. Parameters to be Tested and Frequency
  - f. Project Schedule
2. Project Organization and Responsibility
3. Data Management Plan
  - a. Describe tracking, sorting, retrieving data
  - b. Identify software for data storage,
  - c. Minimum data requirements & data format
  - d. Data backup procedures
  - e. Submission of data in format(s) acceptable to EPA

4. Quality Assurance Objective for Measurement Data
  - a. Level of Quality Control Effort
  - b. Accuracy, Precision, and Sensitivity of Analysis
  - c. Completeness, Representativeness and Comparability
5. Sampling Procedures
6. Sample Custody
  - a. Field Specific Custody Procedures
  - b. Laboratory Chain-of-Custody Procedures
7. Calibration Procedures and Frequency
  - a. Field Instruments/Equipment
  - b. Laboratory Instruments
8. Analytical Procedures
  - a. Non-contract Laboratory Program Analytical Methods
  - b. Field Screening and Analytical Protocol
  - c. Laboratory Procedures
9. Internal Quality Control Checks
  - a. Field Measurements
  - b. Laboratory Analysis
10. Data Reduction, Validation, and Reporting
  - a. Data Reduction
  - b. Data Validation
  - c. Data Reporting
11. Performance System Audits
  - a. Internal Audits of Field Activity
  - b. Internal Laboratory Audit
  - c. External Field Audit
  - d. External Laboratory Audit

12. Preventative Maintenance
  - a. Routine Preventative Maintenance Procedures and Schedules
  - b. Field Instruments/Equipment
  - c. Laboratory Instruments
13. Specific Routine Procedures to Assess Data Precision, Accuracy, and Completeness
  - a. Field Measurement Data
  - b. Laboratory Data
14. Corrective Action
  - a. Sample Collection/Field Measurements
  - b. Laboratory Analysis
15. Quality Assurance Reports to Management

### **C. Health and Safety Plan**

The Settling Defendants, or their contractors, shall develop and submit in accordance with the schedule in Section VI of this SOW, remedial action health and safety plans (RAHSPs) which are designed to protect on-site personnel and area residents from physical, chemical, and all other hazards posed by this remedial action. The RAHSPs shall develop the performance levels and criteria necessary to address the following areas:

- Facility description
- Personnel
- Levels of protection
- Safe work practices and safeguards
- Medical surveillance
- Personal protective equipment
- Personal hygiene
- Decontamination—personal and equipment
- Site work zones

- Contaminant control
- Contingency and emergency planning, including SPCC
- Logs, reports, and record keeping

The RAHSP shall follow EPA guidance and all OSHA requirements as outlined in 29 C.F.R. 1910 and 1926. The Settling Defendants may utilize existing Health and Safety Plan (HASP) project documents (e.g., pre-remedial design HASP) or other company/contractor HASPs provided that the Settling Defendants demonstrate the HASP has been modified, as necessary, or otherwise sufficiently addresses the activities covered by this SOW.

#### **D. Field Sampling Plan**

The Settling Defendants shall develop and submit, in accordance with the schedule in Section VI of this SOW, field sampling plan(s) (FSPs) (or equivalent documents/appendices) as described in “Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA”, October 1988. The FSPs will supplement the QAPP and address all sample collection activities under this SOW.

#### **Task 6: Operation, Maintenance & Monitoring**

The Settling Defendants shall submit for EPA approval in accordance with the schedule in Section VI of this SOW, a post-remedial action Operation, Maintenance, & Monitoring Plan (OMMP) for each discrete remedial action design elements of the Mouth of Hylebos Waterway Problem Area identified in Task 2, unless otherwise approved by EPA, and an overall Mouth of Hylebos long-term OMMP. The objectives of the OMMP(s) shall include:

- Confirmation that performance standards are achieved by the remedial action;
- Confirmation that SQOs are still maintained in the SMAs dredged within the Mouth of Hylebos Waterway Problem Area;
- Confirmation that exposure of subsurface contamination has not occurred through physical processes such as storms or ship scour;
- Evaluation of the effectiveness of capping areas;
- Evaluation of the effectiveness of the NCD Facility ;
- Confirming natural recovery in designated areas within 10 years following completion

- of remedial actions in adjacent areas;
- Evaluation of the long-term effectiveness of source control;
- Evaluation of the long-term effectiveness of habitat mitigation; and
- Evaluation of leachability of treated Area 5106 Sediment on other materials confined in the NCD Facility.

The Settling Defendants shall prepare an OMMP(s) to cover both implementation and long-term maintenance and monitoring of the remedial action, including mitigation areas. Each draft OMMP shall be submitted with the corresponding Draft Final (90%) Design. The final OMMP(s) shall be submitted to EPA no later than the corresponding Remedial Action Work Plan submittal. The final OMMP(s) shall address all comments made to the draft OMMP(s) and will be subject to EPA approval. After results for each monitoring event are reported, the final OMMP(s) will be reviewed and revised as necessary, under EPA direction and approval. Monitoring may include, but not be limited to the following types of actions:

- Bathymetry;
- Sediment chemistry;
- Confirmatory biological analyses (i.e., sediment bioassays or benthic infaunal abundance);
- Groundwater chemistry at the NCD Facility; and
- Seepage chemistry for specific SMAs.

The Settling Defendants shall propose the appropriate monitoring elements necessary to achieve the specified monitoring objectives in this SOW for the remedial action. A rationale for the proposed monitoring actions shall also be included. However, long-term monitoring to ensure the effectiveness of the remedial action, including mitigation, will continue as long as contaminated sediments are left in place.

The OMMP(s) shall be composed of the following elements:

1. Description of normal operation and maintenance:
  - a. Description of tasks to achieve each monitoring objective;
  - b. Description of tasks for maintenance;
  - c. Schedule showing frequency of each OMMP task; and

- d. Summary table of OMMP activities for all activities (e.g., NCD Facility, Segment 3, 4 & 5 cleanups; embankments, mitigation, etc.)
2. Description of routine monitoring and laboratory testing:
  - a. Description of monitoring tasks;
  - b. Description of required data collection (including sample type, number, location and frequency), laboratory tests, and their interpretation;
  - c. Required quality assurance and quality control, SAP & HASP (or addenda);
  - d. Schedule of monitoring frequency; and
  - e. Description of verification sampling procedures if SQOs or performance standards are exceeded in routine monitoring.
3. Corrective Action:
  - a. Description of corrective action to be implemented in the event that cleanup or performance standards are not met (e.g., if exceedances of SQOs are detected, identify additional sampling and/or analysis to be conducted by the Settling Defendants to identify appropriate response actions, if any); and
  - b. Schedule for implementing these corrective actions.
4. Description of procedures for a request to EPA to reduce the frequency of or discontinue monitoring.
5. Records and reporting mechanisms required:
  - a. Laboratory records;
  - b. Records for long-term monitoring costs;
  - c. Documentation to comply with CERCLA 5-year Review Reporting Requirements; and
  - d. Reports to State or Federal Agencies.

The final OMMP(s) shall include detailed descriptions of all sampling activities, such as groundwater and sediment quality monitoring, and shall establish requirements for quality assurance sampling activities including the sampling protocols, sample size, locations, frequency of testing, acceptance and rejection data sheets, problem identification and corrective measures reports, evaluation reports, acceptance reports, and final documentation. The OMMP(s) shall



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include a sediment sampling operations manual, quality assurance project plans, and health and safety plans for sediment sampling activities. Existing EPA-approved (HCC) QAPPs and other EPA-approved supporting documents may be referenced or included as appropriate. As needed, the OMMP may also include procedures to allow for temporary disturbances of remediated areas (e.g., certain operations in capped embankment areas).

## **V. CURRENT STATUS OF WORK PERFORMED BY SETTLING DEFENDANTS**

The Settling Defendants have completed several of the tasks, as described in Section IV, required by this SOW. This Section details the current status of the six tasks outlined in Section IV. All of these activities and approvals are incorporated into this SOW.

### **Task 1: Remedial Design Work Plan**

The Settling Defendants submitted an RD Work Plan to EPA for review and approval on April 29, 2002. EPA approval of the RD Work Plan was received on July 3, 2002.

### **Task 2: Remedial Design**

The Settling Defendants have submitted the following design deliverables in accordance with this SOW. All activities which have been approved by EPA are incorporated into this SOW by this reference.

#### **A. Clear Creek Habitat**

The Settling Defendants submitted the Final (100%) Project Plans and Specifications, and CQAP for the Clear Creek Habitat Improvement Project on March 27, 2003 as part of the RA Work Plan for this project.

#### **B. Slip 5 Habitat**

Because the Slip 5 Habitat Site is being constructed in two phases, design submittals were submitted addressing the two Phases separately. The Settling Defendants submitted the Phase I Plans and Specifications to EPA on August 2, 2002, which included several appendices, including the CQAP for Slip 5 Habitat Construction – Phase I (Pacific International Engineering, 2002). The Plans and Specifications for Phase I were later updated by two addenda, each of which were submitted to EPA on September 3, 2002. Addendum Number One for the Slip 5 Habitat Construction – Phase I essentially transmitted to the bidding community copies of the actual permits and approvals obtained by the Port since the Plans and Specifications were put out for public bidding. Addendum Number Two modified the amount of the Slip 5 Habitat Construction

– Phase I work that was to be completed during the term of the contract. This change to the amount of work required under the Phase I Specifications was made in response to a number of members of the bidding community informing the Port of Tacoma that they did not believe the contract time frame allowed enough time for construction of all of Phase I, Stage 2. Based on this change, the work that was not completed as part of Phase I construction will be included in the Phase II construction contract.

Plans and Specifications for the Slip 5 Mitigation Phase 2 were submitted to EPA on June 20, 2003. The Specifications for Phase 2 of the Project included a number of appendices including the Slip 5 Habitat Construction – Phase 2 Construction Quality Assurance Plan (Grette Associates 2003).

### **C. Hylebos Segment 5 Cleanup/Slip 1 NCD Facility**

Pursuant to receipt of EPA's comments on the Draft Final (90%) Design submittal (Hart Crowser et al. 2001), the Settling Defendants submitted a Final (100%) Design for the Hylebos Waterway Segment 5 Cleanup / Slip 1 NCD Facility Project to EPA on June 20, 2003 (Hart Crowser et al 2003c). This final submittal followed the Draft Final (90%) Design submittal, a supplemental technical memo regarding Slip 1 containment berm construction (Hart Crowser 2002), and two interim drafts of the Final Design (January 22 and March 14, 2003). These deliverables provided the basis of design for the dredging of sediments from Segment 5 of the Hylebos Waterway and placement in either the PSDDA open-water disposal site or the Slip 1 NCD Facility. The documents also provided the basis of design for construction of the Slip 1 NCD Facility, including pier demolition and containment berm construction. EPA provided conditional approval for the Segment 5 portion of the project on February 27, 2003.

### **D. Hylebos Segments 3 and 4 Cleanup**

The Settling Defendants submitted a Preliminary (30%) Design Memorandum for the Hylebos Waterway Segments 3 and 4 Project for EPA review and comment in August 2002 (Anchor et al. 2002). Following receipt of EPA comments (dated January 17, 2003), the Settling Defendants resubmitted a Revised Preliminary (30%) Design Memorandum in May 2003 (Anchor et al. 2003). Defendants then submitted a Draft Final (90%) Design to EPA on October 30, 2003. In addition, this document summarized the basis of design for the Slip 1 NCD Facility, as presented

in the Segment 5 Final Design (Hart Crowser et al. 2003). Upon receipt of EPA comments dated November 25, 2003 on the Draft (90%) Final Design and subsequent meetings with EPA, the Settling Defendants submitted a “Revised” Draft (90 Percent) Final Design on January 30, 2004. A Final (100 Percent) Design submittal was submitted in May 2004 following receipt of EPA’s comments on the Draft Final (90%) Design dated March 31, 2004. EPA provided a partial and conditional approval for the Segment 3-4 remedial design on July 15, 2004.

#### **E. Pier 25 Embankment**

The Settling Defendants submitted a Draft Final (90%) Design submittal for the Pier 25 Embankment on July 9, 2001. The Pier 25 design is currently in progress.

#### **F. Biological Assessment Addendum**

The Settling Defendants submitted a Biological Assessment (BA – Grette Associates, February 2003) as an addendum to the BA prepared by EPA for the entire Commencement Bay Nearshore/Tideflats Superfund Site (EPA 2000a). Biological Opinions were prepared by NOAA Fisheries and the U.S. Fish and Wildlife Service on August 21, 2003 and September 11, 2003, respectively.

#### **Task 3: Remedial Action Work Plan**

The Settling Defendants have submitted, and EPA has approved, RA Work Plans for five of the seven discrete groups of construction activities listed in Task 2 of Section IV, including Clear Creek and Slip 5 habitats, Slip 1 pier demolition, Stage I berm construction, and Segment 5 cleanup. EPA provided a partial and conditional Segment 3-4 Work Plan approval on July 15, 2004.

#### **Task 4: Remedial Action Construction and Documentation**

The Settling Defendants have initiated remedial action on six of the seven discrete groups of construction activities listed in Task 3 including Clear Creek and Slip 5 habitats, Slip 1 pier demolition, Stage I berm construction, Segment 5 Cleanup/Slip 1 NCD Facility, and Segment 3-4 cleanup.

Preconstruction meetings/inspections were held for each of these construction elements, the dates of which are summarized in Section VI of this SOW. The Settling Defendants also participated in regularly scheduled RA briefings and progress meetings with the construction contractor, EPA and other agency representatives.

The defendants believe that remedial action has been completed for the five discrete activities listed above. Pre-Final and/or Final Construction Inspection letters/reports and/or RA Construction/Completion reports have been completed for the following.

- Clear Creek Habitat Improvement: Final Inspection /RA Completion Report submitted January 13, 2004;
- Slip 5 Habitat Construction-Phase I: Final Inspection/RA Completion Report submitted March 27, 2003;
- Slip 1 Pier Demolition: Pre-Final/final Inspection Report submitted February 4, 2003;
- Stage I Containment Berm: Final Inspection/RA Completion Report submitted March 6, 2003; and
- Segment 5 Cleanup: Pre-Final Inspection Report submitted February 11, 2004.

#### **Task 5: Performance Monitoring and Construction Quality Assurance**

The Settling Defendants submitted a CQAP for the Stage I Berm Construction component on August 30, 2002, which was approved by EPA on September 20, 2002. The Settling Defendants have also submitted a Final (100%) CQAP for the Hylebos Segment 5 cleanup project, which was approved by EPA on February 27 and July 16, 2003. As part of the Segment 5 RA Work Plan, the Settling Defendants submitted a RAHSP prepared by the construction contractor (Miller Contracting) for the Segment 5 Cleanup Project.

The Settling Defendants submitted a Final (100%) CQAP for the Clear Creek Habitat Mitigation Project on March 27, 2003. The Final CQAPs for Phase I and Phase II of the Slip 5 Habitat Improvement Project were submitted to EPA on July 19, 2002 and June 20, 2003 respectively.

The Draft Final (90%) CQAP for the Segments 3 and 4 Cleanup Project was submitted on

October 3, 2003 followed by a Revised Draft Final (90%) CQAP on January 30, 2004. In response to EPA comments dated March 31, 2004, the Final (100%) CQAP for the Segments 3 and 4 Cleanup Project will be submitted in May 2004. Prior to remedial action construction, a revised RAHSP will be submitted with the Segments 3 and 4 RA Work Plan.

A Draft Final (90%) CQAP for the Pier 25 Embankment was submitted by the Settling Defendants on July 9, 2001.

#### **Task 6: Operation, Maintenance & Monitoring**

The Settling Defendants submitted a final OMMP for the Hylebos Segment 5 cleanup project on June 20, 2003. The Settling Defendants also submitted a Draft Final (90%) OMMP for the Segments 3 and 4 Cleanup Project on October 3, 2003 followed by a Revised Draft Final (90%) OMMP on January 30, 2004. In response to EPA comments dated March 31, 2004, and subsequent meetings with EPA, an overall draft Mouth of Hylebos OMMP was submitted to EPA in June of 2004.

A Draft Final (90%) OMMP for the Pier 25 Embankment was submitted to EPA by the Settling Defendants on July 9, 2001.

### **VI. RD/RA SCHEDULE OF DELIVERABLES AND MILESTONES**

The schedule for notification to EPA or submission of major deliverables to EPA is described in Table 3. If the date for submission of any item or notification required by this SOW occurs on a weekend or federal holiday, the date for submission of that item or notification shall be the next working day following the weekend or holiday.

### **VII. References**

Grette Associates 2003. Mouth of Hylebos Waterway – Segment 5 Remediation, Slip 1 Confined Disposal Facility Project Biological Assessment Addendum, Commencement Bay Nearshore/Tideflats Superfund Site, Tacoma, Washington. Prepared for the Port of Tacoma and Occidental Chemical Corporation. February 2003.

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Hart Crowser, Berger/ABAM, and Anchor 2003. 100 Percent Design Submittal: Hylebos Waterway Cleanup (Segment 5)/Slip 1 Nearshore Confined Disposal (NCD) Facility Project. Prepared for the Port of Tacoma, Washington and Occidental Chemical Corporation, Tacoma, Washington by Hart Crowser, Berger/ABAM, and Anchor Environmental, June 20, 2003.

Hart Crowser 2002. Draft Technical Memorandum: Supplementary Geotechnical Information, Supporting 90 Percent Design Submittal, Hylebos Waterway Segment 5 Cleanup/Slip 1 CDF Project. Prepared by Hart Crowser, Inc., dated May 23, 2002.

Anchor 2002. Preliminary (30 Percent) Design Memorandum, Hylebos Waterway Remedial Design, Segments 3 and 4. Prepared for Occidental Chemical Corporation and the Port of Tacoma, August 2002.

Anchor 2003b. Revised Preliminary (30 Percent) Design Memorandum, Hylebos Waterway Remedial Design, Segments 3 and 4. Prepared for Occidental Chemical Corporation and the Port of Tacoma, May 2003.

Simenstad, Charles A. 2000. Commencement Bay Aquatic Ecosystem Assessment: Ecosystem-Scale Restoration for Juvenile Salmon Recovery. Prepared for the City of Tacoma, Washington Department of Natural Resources and the U.S. Environmental Protection Agency.

Washington State Department of Ecology 2000. Milestone 5 report - See Section II.A

Pacific International Engineering 2002. July 19, 2002

# **APPENDIX A**

## **TABLE 1**



**Table 1 - Applicable Surface Sediment Quality Criteria  
Hylebos Waterway Phase I Cleanup Actions**

PARAMETER	Sediment Quality Objective (SQO)	Sediment Remedial Action Level (SRAL)
<b>Metals (mg/kg dry weight):</b>		
Antimony	150	(a)
Arsenic	57	(a)
Cadmium	5.1	(a)
Copper	390	(a)
Lead	450	(a)
Mercury	0.59	(a)
Nickel	140	(a)
Silver	6.1	(a)
Zinc	410	(a)
<b>Tributyl tin porewater µgTBT/L</b>	0.7	(a)
<b>Volatile Organics (µg/kg dry weight):</b>		
Ethylbenzene	10	(a)
Tetrachlorethene	57	(a)
Total Xylenes	40	(a)
<b>Chlorinated Organic Compounds (µg/kg dry weight):</b>		
1,2-Dichlorobenzene	50	(a)
1,3-Dichlorobenzene	170	(a)
1,4-Dichlorobenzene	110	(a)
1,2,4-Trichlorobenzene	51	(a)
Hexachlorobenzene	22	(a)
Hexachlorobutadiene	11	(a)
<b>Polycyclic Aromatic Hydrocarbons (µg/kg dry weight):</b>		
Naphthalene	2,100	(a)
Acenaphthylene	1,300	(a)
Acenaphthene	500	(a)
Fluorene	540	(a)
Phenanthrene	1,500	(a)
Anthracene	960	(a)
2-Methylnaphthalene	670	(a)
Total LPAHs	5,200	(a)
Fluoranthene	2,500	(a)
Pyrene	3,300	(a)
Benzo(a)anthracene	1,600	(a)
Chrysene	2,800	(a)
Benzo(b+k)fluoranthenes	3,600	(a)
Benzo(a)pyrene	1,600	(a)
Indeno(1,2,3-cd)pyrene	690	(a)
Dibenzo(a,h)anthracene	230	(a)
Benzo(g,h,i)perylene	720	(a)
Total HPAHs	17,000	(a)
<b>Phthalates (µg/kg dry weight):</b>		
Dimethylphthalate	160	(a)
Diethylphthalate	200	(a)
Di-n-butylphthalate	1,400	(a)
Butylbenzylphthalate	900	(a)
Bis(2-ethylhexyl)phthalate	1,300	(a)
Di-n-octylphthalate	6,200	(a)
<b>Phenols (µg/kg dry weight):</b>		
Phenol	420	(a)
2-Methylphenol	63	(a)
<b>Phenols (µg/kg dry weight):</b>		
4-Methylphenol	670	(a)
2,4-Dimethylphenol	29	(a)

**Table 1 - Applicable Surface Sediment Quality Criteria  
Hylebos Waterway Phase I Cleanup Actions**

PARAMETER	Sediment Quality Objective (SQO)	Sediment Remedial Action Level (SRAL)
Pentachlorophenol	360	(a)
<b>Miscellaneous Extractable Compounds (µg/kg dry weight):</b>		
Benzyl alcohol	73	(a)
Benzoic acid	650	(a)
Dibenzofuran	540	(a)
N-Nitrosodiphenylamine	28	(a)
<b>Pesticides and PCBs (µg/kg dry weight):</b>		
p,p'-DDE	9	(a)
p,p'-DDD	16	(a)
p,p'-DDT	34	(a)
Total PCBs	300	450
<b>Confirmatory Biological Testing Determinations (optional):</b>		
<b>Overall Interpretation</b>	The SQO is exceeded when any one of the confirmatory marine sediment biological tests of WAC 173-204-315(1) demonstrates the following results:	The SRAL is exceeded when numerical SRALs described in note (a) are exceeded, or when any two of the biological tests exceed the SQO biological criteria, or one of the following test determinations is made:
<b>Amphipod Toxicity Bioassay</b>	The test sediment has a lower (statistically significant, t-test, p=0.05) mean survival than the reference sediment, and the test sediment mean survival is less than 75 percent, on an absolute basis.	The test sediment has a lower (statistically significant, t-test, p=0.05) mean survival than the reference sediment, and the test sediment mean survival is 30 percent lower than a value represented by the reference sediment mean mortality plus thirty percent.
<b>Larval Toxicity/Abnormality Bioassay</b>	The test sediment has a mean survivorship of normal larvae that is less (statistically significant, t-test, p=0.10) than the mean normal survivorship in the reference sediment, and the test sediment mean normal survivorship is less than 85 percent of the mean normal survivorship in the reference sediment (i.e., the test sediment has a mean combined abnormality and mortality that is greater than 15 percent relative to time-final in the reference sediment).	The test sediment has a mean survivorship of normal larvae that is less (statistically significant, t-test, p=0.10) than the mean normal survivorship in the reference sediment, and the test sediment mean normal survivorship is less than 70 percent of the mean normal survivorship in the reference sediment (i.e., the test sediment has a mean combined abnormality and mortality that is greater than 30 percent relative to time-final in the reference sediment).
<b>Juvenile Polychaete Growth Bioassay</b>	The test sediment has a mean individual growth rate of less than 70 percent of the reference sediment mean individual growth rate and the test sediment mean individual growth rate is statistically different (t-test, p=0.05) from the reference sediment mean individual growth rate.	The test sediment has a mean individual growth rate of less than 50 percent of the reference sediment mean individual growth rate and the test sediment mean individual growth rate is statistically different (t-test, p=0.05) from the reference sediment mean individual growth rate.

**NOTES:** (a) SRALs are the enforceable cleanup standard for this action; see Section 2.C.1 of the SOW. Numerical SRALs vary by location within the Hylebos Waterway, largely because of varying sediment rate. Specific SRAL values for the Hylebos Phase I Cleanup Project are set forth in Chapter 3 of the PDER, and may be refined during remedial design using equivalent procedures.

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## **TABLE 2**

**Table 2 - Applicable Surface Water Quality Criteria  
Hylebos Waterway Phase I Cleanup Actions**

<b>PARAMETER</b>	<b>Chronic Criterion (b)</b>	<b>Acute Criterion (c)</b>
<b>Conventional (a):</b>		
Dissolved Oxygen (mg/L)	5.0 or < 0.2 change	N/A
Turbidity (NTU)	< 10 NTU or 20%	N/A
<b>Metals (µg/L):</b>		
Copper (dissolved)	3.1	4.8
Lead (dissolved)	8.1	210
Mercury (total)	0.025	1.8
Nickel (dissolved)	8.2	74
Silver (dissolved)	N/A	1.9
Zinc (dissolved)	81	90
<b>Volatile Organics (µg/L):</b>		
Dichloroethenes (total)	N/A	224,000
Tetrachlorethene	450	10,200
Trichloroethene	N/A	2,000
Vinyl chloride	525	N/A
<b>Semivolatile Organics (µg/L):</b>		
Hexachlorobutadiene	N/A	32

**NOTES:**

- (a) Water quality standards for these parameters are set forth in WAC 173-201A-030(3)
- (b) 48-hour average concentration
- (c) 1-hour average concentration

# **APPENDIX A**

## **TABLE 3**

**Table 3 - RD/RA Schedule of Deliverables and Milestones**

Item	Milestone	Description <sup>a</sup>	Submittal/Completion Date	EPA Comment or Approval Date
<b>Clear Creek Habitat Improvement</b>				
1.	<b>Task 1:</b> Remedial Design Work Plan	15 days after UAO effective date		
	<b>Task 2:</b> Remedial Design			
2.	A. Preliminary (30%) Design			
3.	B. Draft Final (90%) Design	60 days after receipt of EPA comments on 30% Design		
4.	C. Final (100%) Design	45 days after receipt of EPA comments on 90% Design		
5.	<b>Task 3:</b> Remedial Action Work Plan	45 days after approval of 100% Design		
	<b>Task 4:</b> Remedial Action Construction			
6.	A. Award RA Construction Contract	Not later than (NLT) 45 days after approval of design and RA Work Plan		
7.	B. Notification of RA Start	30 days prior to start of construction		
8.	C. Pre-Construction Inspection Meeting	15 days after award		
9.	D. Initiate Construction	NLT 50 days after award		
10.	E. RA Briefings and Progress Meetings	Weekly during construction	Weekly during construction	
11.	F. Prefinal Construction Inspection/Meeting	NLT 30 days after completion of construction	January 13, 2004	
12.	a. Prefinal Construction Inspection	7 days after the prefinal construction inspection	January 20, 2004	

	Letter/Report(s)			
13.	G. Final Construction Inspection	NLT 30 days after completion of work identified in prefinal construction inspection letter	January 13, 2004	
14.	a. Final Construction Inspection Letter/Report(s)	NLT 30 days after final inspection	January 20, 2004	
15.	H. Reports			
16.	a. Remedial Action Construction Report			
17.	b. Final Remedial Action Report	At the completion of all RA		
18.	<b>Task 5:</b> Performance Monitoring and Construction Quality Assurance	Included with corresponding design submittal		
19.	<b>Task 6:</b> Long-term Operation, Maintenance & Monitoring	Included with corresponding design submittal		
<b>Slip 5 Habitat Construction</b>				
20.	<b>Task 1:</b> Remedial Design Work Plan	15 days after UAO effective date		
	<b>Task 2:</b> Remedial Design			
21.	A. Preliminary (30%) Design			
22.	B. Draft Final (90%) Design	60 days after receipt of EPA comments on 30% Design		
23.	C. Final (100%) Design	45 days after receipt of EPA comments on 90% Design		
24.	<b>Task 3:</b> Remedial Action Work Plan	45 days after approval of 100% Design	August 2, 2002	
	<b>Task 4:</b> Remedial Action Construction			

25.	A. Award RA Construction Contract	Not later than (NLT) 45 days after approval of design and RA Work Plan		
26.	B. Notification of RA Start	30 days prior to start of construction		
27.	C. Pre-Construction Inspection Meeting	15 days after award		
28.	D. Initiate Construction	NLT 50 days after award		
29.	E. RA Briefings and Progress Meetings	Weekly during construction	Weekly during construction	Weekly during construction
30.	F. Prefinal Construction Inspection/Meeting	NLT 30 days after completion of construction		
31.	a. Prefinal Construction Inspection Letter/Report(s)	7 days after the prefinal construction inspection		
32.	G. Final Construction Inspection	NLT 30 days after completion of work identified in prefinal construction inspection letter	March 20, 2003	
33.	a. Final Construction Inspection Letter/Report(s)	NLT 30 days after final inspection	March 27, 2003	
	H. Reports			
34.	a. Remedial Action Construction Report			
35.	b. Final Remedial Action Report	At the completion of all RA		
36.	<b>Task 5:</b> Performance Monitoring and Construction Quality Assurance	Included with corresponding remedial design submittal	March 28, 2003 (Draft)	
37.	<b>Task 6:</b> Long-term Operation,	Included with corresponding		



	Maintenance & Monitoring	remedial design submittal		
<b>Segment 5 Cleanup/Slip 1 NCD Facility</b>				
38.	<b>Task 1:</b> Remedial Design Work Plan	15 days after UAO effective date	April 29, 2002	July 3, 2002
	<b>Task 2:</b> Remedial Design			
39.	A. Preliminary (30%) Design		May 1, 2000	
40.	B. Draft Final (90%) Design	60 days after receipt of EPA comments on 30% Design	June 29, 2001	September 27, 2001 (Draft)
41.	1. Supplemental Memo	NA	May 23, 2002	NA
42.	C. Final (100%) Design	45 days after receipt of EPA comments on 90% Design	January 22, 2003	February 27, 2003
43.	1. Revised Final (100%) Design	NA	March 14, 2003	NA
44.	2. Final (100%) Design	NA	June 20, 2003	July 16, 2003
45.	<b>Task 3:</b> Remedial Action Work Plan	45 days after approval of 100% Design		
	1. Pier Demolition		July 22, 2002	July 23, 2002
	2. Stage I Containment Berm		August 30, 2002	September 20, 2002
	3. Segment 5 Cleanup		June 20, 2003	August 8, 2003
	<b>Task 4:</b> Remedial Action Construction			
46.	A. Award RA Construction Contract	Not later than (NLT) 45 days after approval of design and RA Work Plan		
47.	1. Pier Demolition			
48.	2. Stage I Containment Berm			
49.	3. Segment 5 Cleanup			
50.	B. Notification of RA Start	30 days prior to start of construction		
51.	C. Pre-Construction Inspection	15 days after award		

	Meeting			
52.	1. Pier Demolition		August 1, 2002	
53.	2. Stage I Containment Berm		October 23, 2002	
54.	3. Segment 5 Cleanup		April 30, 2003	
55.	D. Initiate Construction	NLT 50 days after award		
56.	1. Pier Demolition		August 2, 2002	
57.	2. Stage I Containment Berm		November 9, 2002	
58.	3. Segment 5 Cleanup		July 16, 2003	
59.	E. RA Briefings and Progress Meetings	Weekly during construction	Weekly during construction	Weekly during construction
60.	F. Prefinal Construction Inspection/Meeting			
61.	1. Pier Demolition	NLT 30 days after completion of construction	November 21, 2002	
62.	a. Prefinal Construction Inspection Letter/Report(s)	7 days after the prefinal construction inspection	November 21, 2002	
63.	2. Stage I Containment Berm	NLT 30 days after completion of construction	January 16, 2003	
64.	a. Prefinal Construction Inspection Letter/Report(s)	7 days after the prefinal construction inspection	February 4, 2003	
65.	3. Segment 5 Cleanup	NLT 30 days after completion of construction	February 12, 2004	
66.	a. Prefinal Construction Inspection Letter/Report(s)	7 days after the prefinal construction inspection	February 12, 2004	
67.	G. Final Construction Inspection			
68.	1. Pier Demolition	NLT 30 days after completion	December 10, 2002	

		of work identified in prefinal construction inspection letter		
69.	a. Final Construction Inspection Letter/Report(s)	NLT 30 days after final inspection	January 10, 2003	
70.	2. Stage I Containment Berm	NLT 30 days after completion of work identified in prefinal construction inspection letter	February 4, 2003	
71.	a. Final Construction Inspection Letter/Report(s)	NLT 30 days after final inspection	March 6, 2003	
72.	3. Segment 5 Cleanup	NLT 30 days after completion of work identified in prefinal construction inspection letter		
73.	a. Final Construction Inspection Letter/Report(s)	NLT 30 days after final inspection		
	H. Reports			
74.	a. Remedial Action Construction Report			
75.	1. Pier Demolition		January 10, 2003	
76.	2. Stage I Containment Berm		March 6, 2003	
77.	3. Segment 5 Cleanup			
78.	b. Final Remedial Action Report	At the completion of all RA		
79.	<b>Task 5:</b> Performance Monitoring and Construction Quality Assurance	Included with corresponding remedial design submittal	See Task 2	See Task 2
80.	<b>Task 6:</b> Long-term Operation,	Included with corresponding	See Task 2	

	Maintenance & Monitoring	remedial design submittal		
<b>Segments 3 and 4 Cleanup</b>				
81.	<b>Task 1:</b> Remedial Design Work Plan	15 days after UAO effective date	April 29, 2002	July 3, 2002
	<b>Task 2:</b> Remedial Design			
82.	A. Preliminary (30%) Design		August 2002	January 17, 2003
83.	1. Revised 30%Design		May 2003	NA
84.	B. Draft Final (90%) Design	60 days after receipt of EPA comments on 30% Design	October 3, 2003	November 25, 2003
85.	1. Revised 90% Design	NA	January 30, 2004	March 31, 2004
86.	C. Final (100%) Design	45 days after receipt of EPA comments on 90% Design	Anticipated May 21, 2004	
87.	<b>Task 3:</b> Remedial Action Work Plan	45 days after approval of 100% Design		
	<b>Task 4:</b> Remedial Action Construction			
88.	A. Award RA Construction Contract	Not later than (NLT) 45 days after approval of design and RA Work Plan		
89.	B. Notification of RA Start	30 days prior to start of construction		
90.	C. Pre-Construction Inspection Meeting	15 days after award		
91.	D. Initiate Construction	NLT 50 days after award		
92.	E. RA Briefings and Progress Meetings	Weekly during construction		
93.	F. Prefinal Construction Inspection/Meeting	NLT 30 days after completion of construction		
94.	a. Prefinal Construction Inspection	7 days after the prefinal construction inspection		

	Letter/Report(s)			
95.	G. Final Construction Inspection	NLT 30 days after completion of work identified in prefinal construction inspection letter		
96.	a. Final Construction Inspection Letter/Report(s)	NLT 30 days after final inspection		
	H. Reports			
97.	a. Remedial Action Construction Report			
98.	b. Final Remedial Action Report	At the completion of all RA		
99.	<b>Task 5:</b> Performance Monitoring and Construction Quality Assurance	Included with corresponding remedial design submittal	See Task 2	See Task 2
100.	<b>Task 6:</b> Long-term Operation, Maintenance & Monitoring	Included with corresponding remedial design submittal	See Task 2	
<b>Pier 25 Embankment</b>				
101.	<b>Task 1:</b> Remedial Design Work Plan	15 days after UAO effective date	April 29, 2002	
	<b>Task 2:</b> Remedial Design			
102.	A. Preliminary (30%) Design			
103.	B. Draft Final (90%) Design	60 days after receipt of EPA comments on 30% Design	July 9, 2001	
104.	C. Final (100%) Design	45 days after receipt of EPA comments on 90% Design		
105.	<b>Task 3:</b> Remedial Action Work Plan	45 days after approval of 100% Design		
	<b>Task 4:</b> Remedial Action Construction			

106.	A. Award RA Construction Contract	Not later than (NLT) 45 days after approval of design and RA Work Plan		
107.	B. Notification of RA Start	30 days prior to start of construction		
108.	C. Pre-Construction Inspection Meeting	15 days after award		
109.	D. Initiate Construction	NLT 50 days after award		
110.	E. RA Briefings and Progress Meetings	Weekly during construction		
111.	F. Prefinal Construction Inspection/Meeting	NLT 30 days after completion of construction		
112.	a. Prefinal Construction Inspection Letter/Report(s)	7 days after the prefinal construction inspection		
113.	G. Final Construction Inspection	NLT 30 days after completion of work identified in prefinal construction inspection letter		
114.	a. Final Construction Inspection Letter/Report(s)	NLT 30 days after final inspection		
	H. Reports			
115.	a. Remedial Action Construction Report			
116.	b. Final Remedial Action Report	At the completion of all RA		
117.	<b>Task 5:</b> Performance Monitoring and Construction Quality Assurance	Included with corresponding remedial design submittal	See Task 2	
118.	<b>Task 6:</b> Long-term Operation,	Included with corresponding	See Task 2	

	Maintenance & Monitoring	remedial design submittal		
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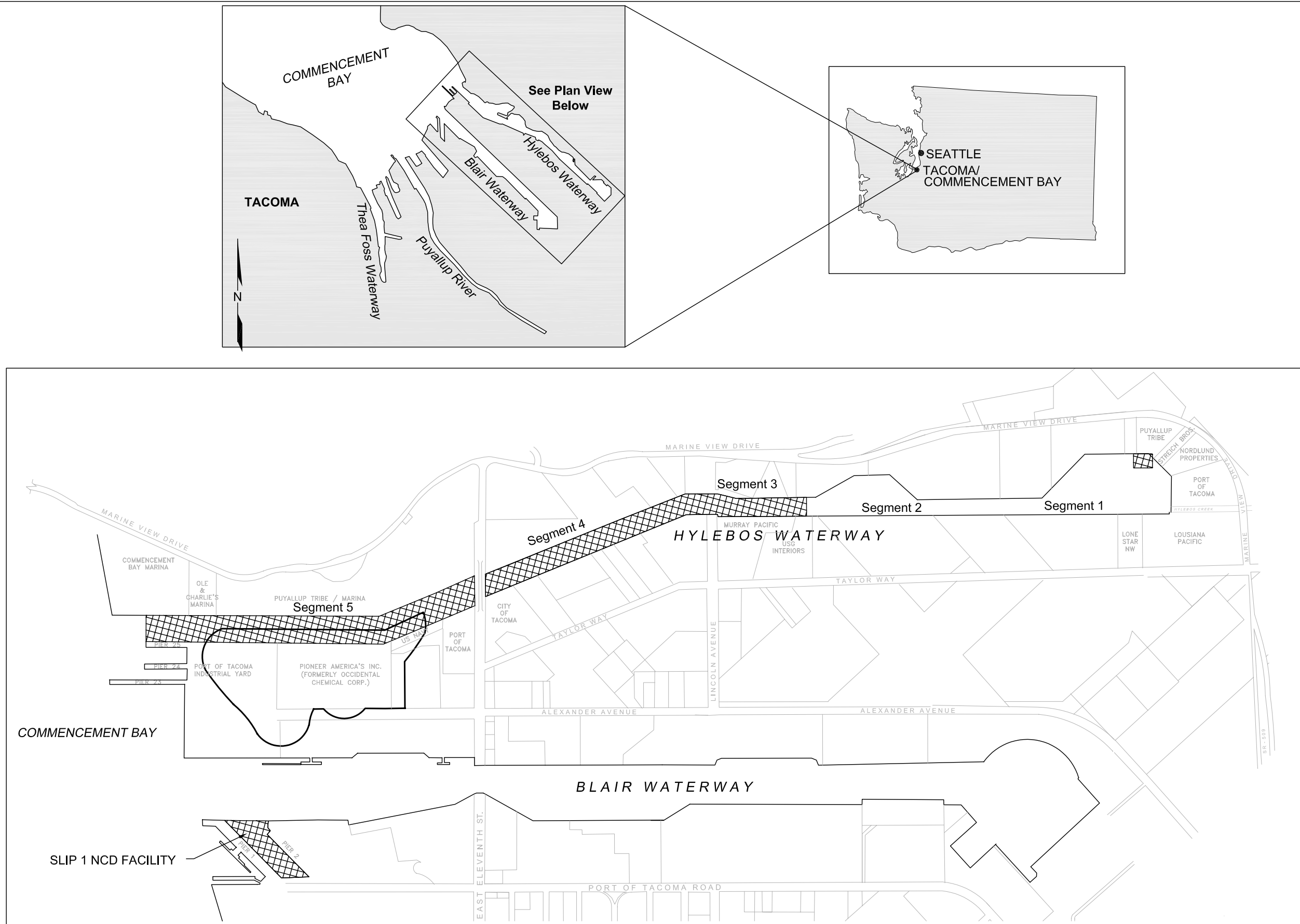
<sup>a</sup> Submittal timing, unless otherwise approved by EPA

# **APPENDIX A**

## **FIGURE 1**



Jan 12, 2005 2:57pm cdavidson K:\Jobs\020049-Hylebos\_Seg\_3-4\_Rem\_D\02004901-56.dwg FIG 1

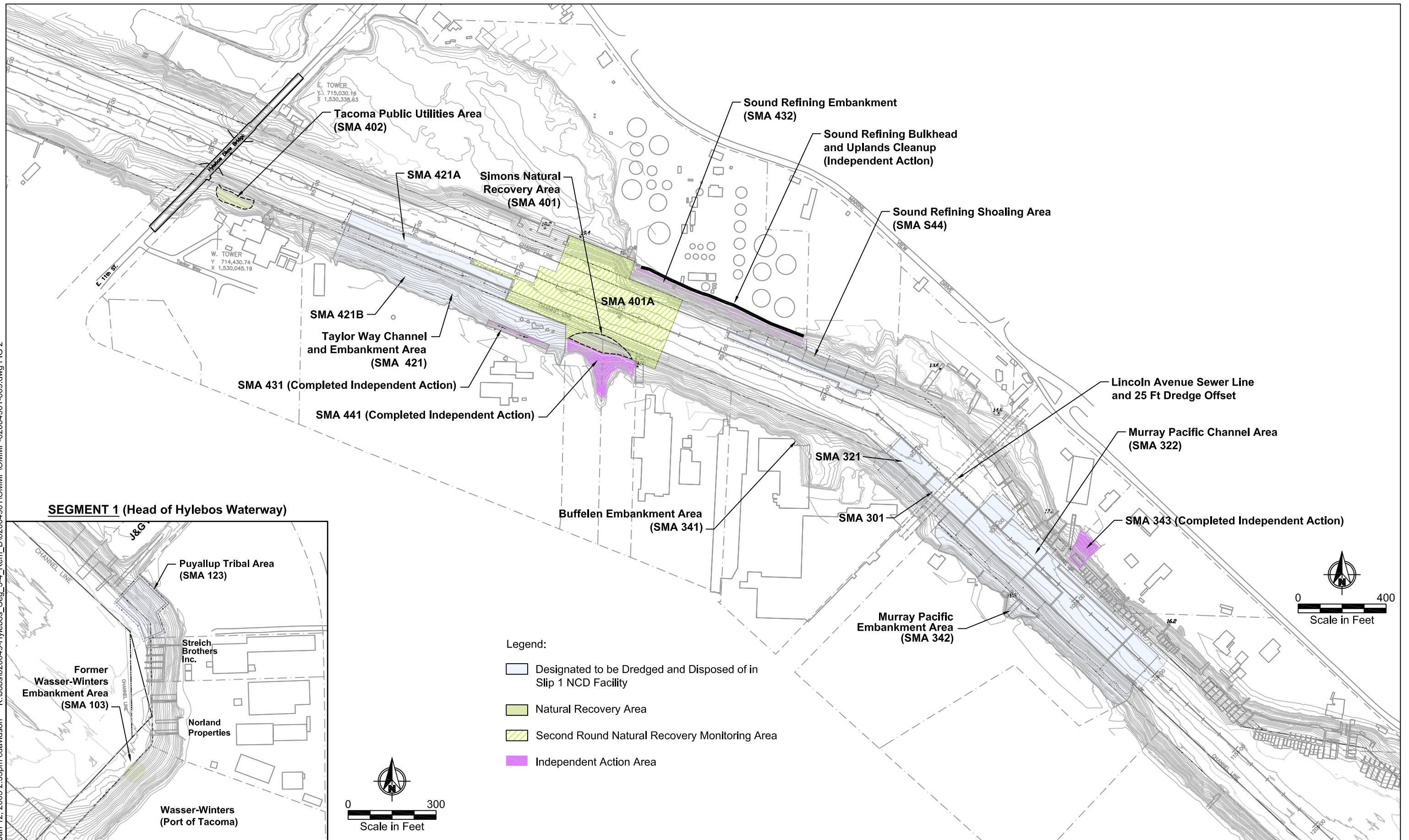


Source: Drawing prepared from electronic file provided by Berger Abam Engineers (2003).

# **APPENDIX A**

## **FIGURE 2**

Jan 12, 2005 2:33pm cdavidson K:\Jobs\020049-Hylebos\_Seg\_3-4\_Rem\_D\02004901\OMMP\OMMP-02004901-009.dwg FIG. 2

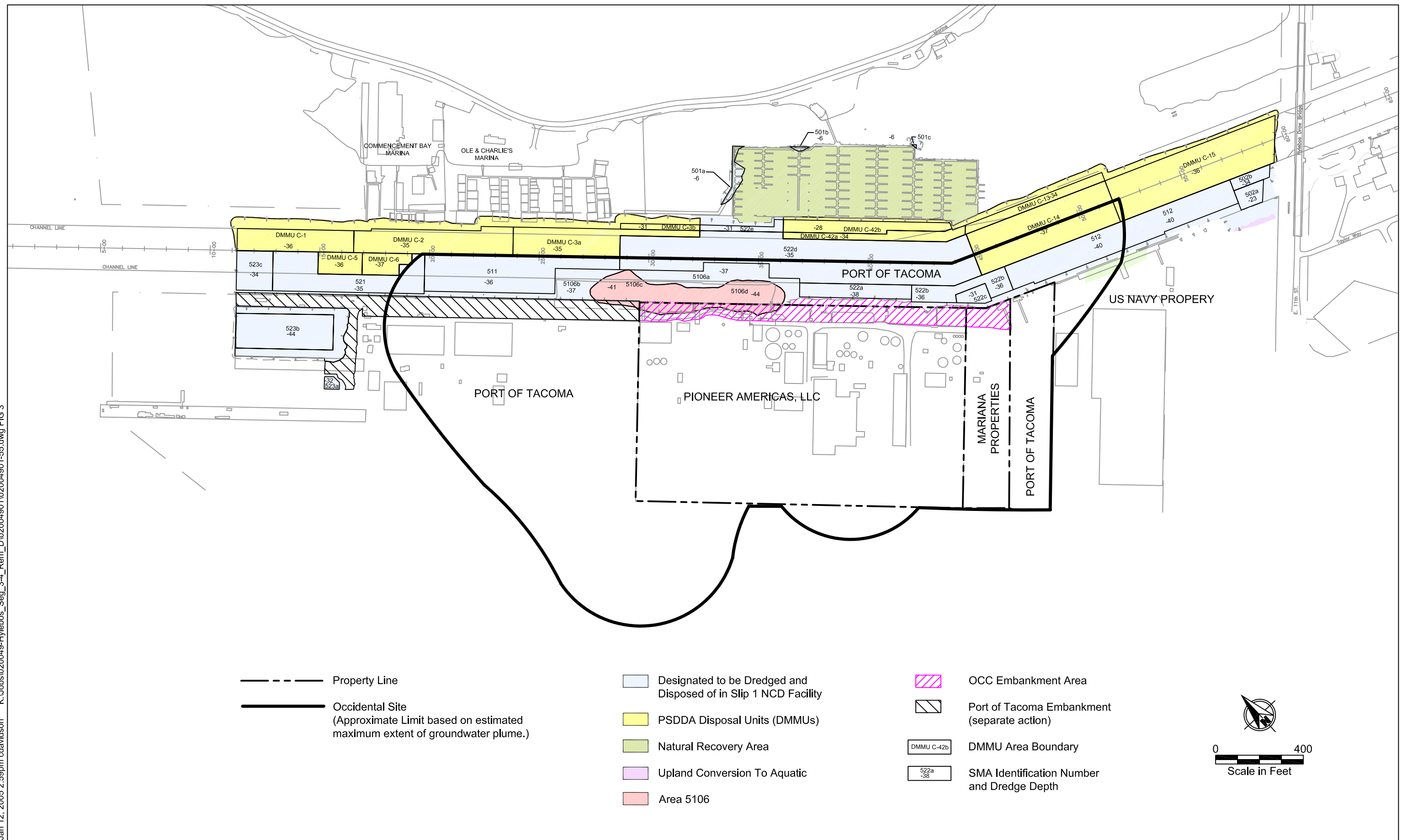


**Figure 2**  
Remedial Action Areas  
Mouth of Hylebos Waterway (Segments 1, 3, and 4)

# **APPENDIX A**

## **FIGURE 3**

Jan 12, 2005 2:59pm cdavidson K:\Jobs\020049-Hylebos\_Seg\_3-4\_Rem\_D\02004901\02004901-55.dwg FIG. 3

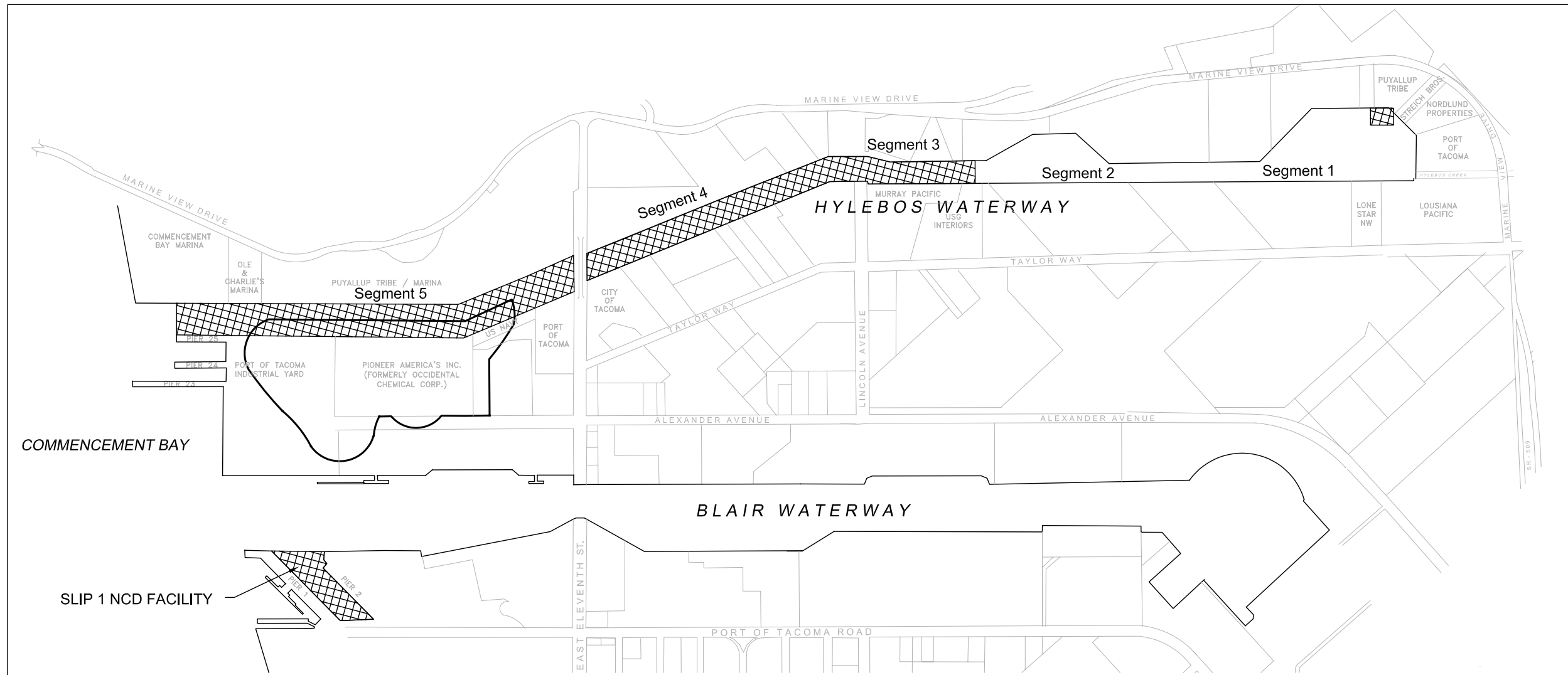
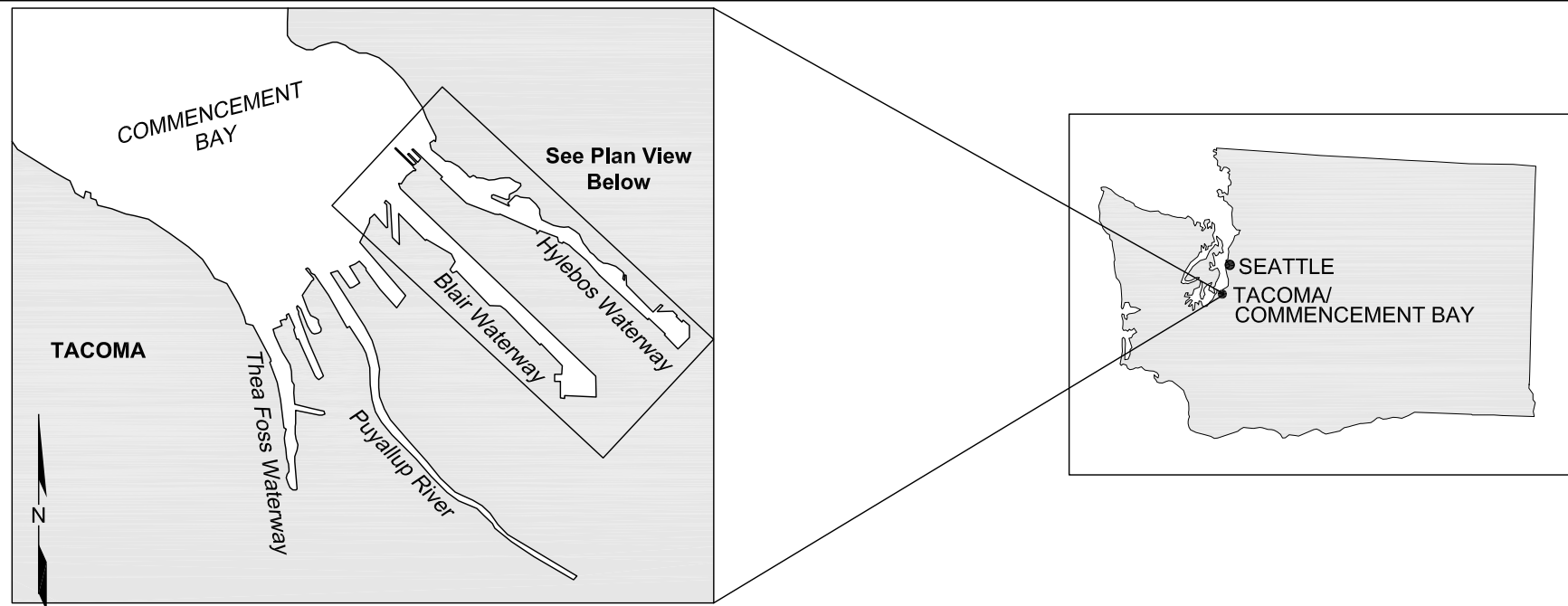


**Figure 3**  
Remedial Action Areas  
Mouth of Hylebos Waterway (Segment 5)

# APPENDIX B

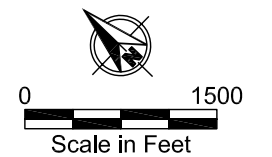


Jan 12, 2005 2:57pm cdavidson K:\Jobs\020049-Hylebos\_Seg\_3-4\_Rem\_D\02004901-56.dwg APP B



Occidental Site  
(approximate limit based  
on estimated maximum  
extent of groundwater  
plume)

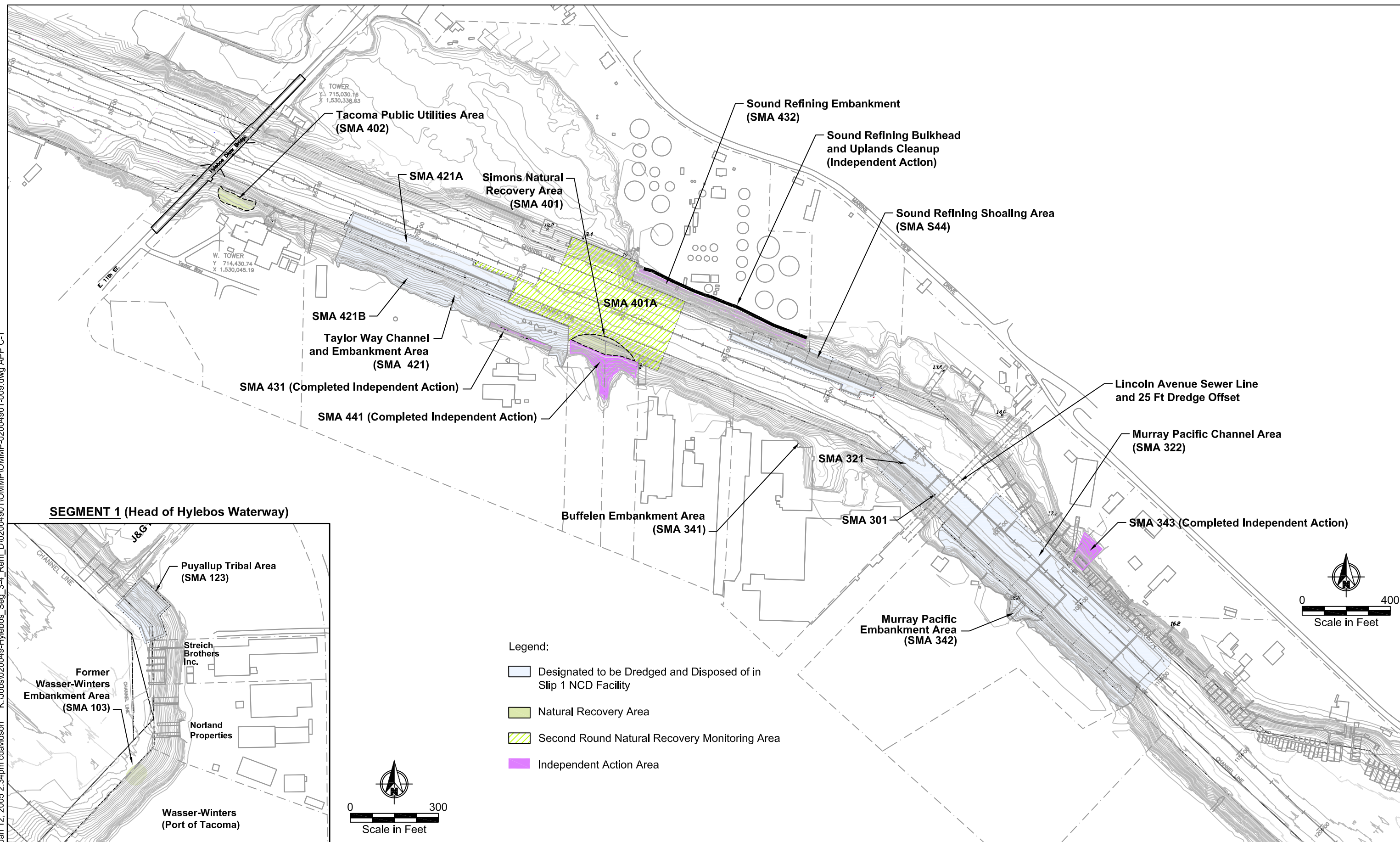
Project Limits of the  
Hylebos Segment 3, 4  
and 5 Cleanup Project



Source: Drawing prepared from electronic file provided by Berger Abam Engineers (2003).

# APPENDIX C-1





# APPENDIX C-2

